TANGANYIKA TERRITORY

# Report

of the

## Department of Agriculture

for the year

## 1924-5.

IMPERIAL BUREAU
12 MAR. 1926
OF MYCOLOGY

DAR ES SALAAM
PRINTED BY THE GOVERNMENT PRINTER

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## For the twelve months ending 31st March, 1925.

### ESTABLISHMENT AND GENERAL ORGANISATION.

1. The arrival of three new District Agricultural Officers during the year permitted an extension of the Department's field services to the district of Kilwa, the stationing of an additional officer in the Mwanza district during the cotton marketing season to assist supervision, and the replacement of the officer of the Rufiji district who had departed on vacation leave and was to be transferred to another district. Two further officers arrived before the end of March, 1925, and it has now been possible to station officers in the Bukoba and Bagamoyo (with Pangani) districts and to make arrangements for the transfer of an officer to the Kigoma district.

2. The absence of the Director for the greater part of the year curtailed the travelling of the Deputy Director for purposes of inspection. On his return, the Director proceeded to Uganda for an investigation of the cotton marketing system preliminary to a change in the system in this Territory in 1925 (see paragraph 23) and visited as well the districts of Mwanza, Tabora and Morogoro.

3. The transfer to Kenya Colony of Mr. R. J. Lathbury left the important agricultural district of Moshi unprovided for between June and November. Pending the filling of the vacancies on the establishment, the services of an experienced Kenya coffee grower (Mr. R. J. Patterson) were secured to supervise the native coffee growing industry and to advise, upon request, the non-native coffee planters. Subsequently, the District Agricultural Officer, Morogoro, was transferred to Moshi when it was possible to fill his place at Morogoro. Mr. Patterson's services are being retained for some months longer.

4. Shortly after his return from leave in June, the Entomologist was engaged in a field survey of cotton pests in the Tabora and Mwanza districts. This was to be followed by a prolonged investigation of coffee, cotton and sisal pests in the Tanga, Lushoto, Moshi and Arusha districts, but illness intervened and it was not possible for this important work to be undertaken.

5. Native agricultural instructors were employed in the various districts as follows:—

| District. | Maximum. | Minimum. |
|---|---|---|
| Arusha | 1 | 0 |
| Bagamoyo | 9 | 5 |
| Bukoba | 2 | 1 |
| Dar es Salaam (including Mafia) | 6 | 3 |
| Iringa | 2 | 0 |
| Kigoma | 2 | 0 |
| Kilwa | 7 | 5 |
| Lindi (including Mikindani) | 16 | 2 |
| Mahenge | 1 | 1 |
| Morogoro (including Kilosa) | 28 | 13 |
| Moshi | 6 | 5 |
| Mwanza | 21 | 13 |
| Pangani | 4 | 2 |
| Rufiji | 8 | 5 |
| Rungwe | 2 | 0 |
| Tabora (including Kahama) | 8 | 5 |
| Tabora, Shinyanga sub-district | 20 | 11 |
| Usambara | 3 | 2 |
| Total | 146 | 73 |

## AGRICULTURAL INSTRUCTION AND EDUCATION.

6. In the absence of a training school for native instructors, these continue to be recruited from untrained but intelligent local natives, who serve a period of apprenticeship under the instruction of the District Agricultural Officer and the more experienced native instructors. By this means it has been possible to augment the field staff and to cover wider areas within the districts. The character of the instruction to native growers may leave something to be desired, with a field staff so imperfectly trained; but the system has at least the advantage of affording to the growers a simplicity and uniformity of instruction in the rudiments of cultivation and preparation for market, and providing an important means of reminding them of the seasonal activities necessary for good crops. The instructor is the vehicle of the District Agricultural Officer's directions; not his own, which, under another system, may very easily be based upon a promiscuous tuition culled from the book rather than from the field. The native instructors, it may be said, are able to read and write in the Swahili language and keep a written record of their work. Advantage is always taken by the District Agricultural Officers of supplementing the individual instructional duties of the native staff by addresses to bodies of natives or native chiefs and by demonstrations at stations or selected native fields. The vernacular monthly journal, *Mambo Leo*, has been used at each issue for agricultural articles that can be read with profit by intelligent natives; and such articles, for non-natives also, are commonly published for the Department in the *Dar es Salaam Times*. Increase of co-operation with the Education Department is desirable; at present the most usual assistance is given through school gardens, an increase in the number of which will be welcomed.

## IMPROVEMENT AND EXTENSION OF CROP PRODUCTION.

7. The methods and services of the Department in improving and extending crop production have been described in previous reports. The season of 1924 has seen a large increase in production of all established export crops. This has been due to increased plantings as well as a favourable season over the greater part of the country. The table in paragraph 56 shows the principal export products, the quantity and value of exports in the last year under the German Government, the progress in recovery after the war and the fluctuating order of importance of the crops from year to year.

8. The chief attention of the Department is given to the cotton crop. A further large increase in the distribution of seed of this crop is to be recorded. The distribution is strictly in accordance with the demands received from the growers, both native and non-native, through organised channels. The distribution to natives is a regular annual service and the Department is, by legislative enactment, the only source of supply. That to non-natives is occasional, as opportunity offers to replace deteriorated by fresh seed. In the ginneries, no mixing of the Department's supply with inferior stocks, or of the different qualities as graded at the cotton markets, takes place, so far as regulation and care can prevent it. Increasing supplies of sound seed thus become available each year. An importation of seed from Uganda was made in 1922 which by 1926 will, it is estimated, have covered the whole of the Territory's cotton-growing areas.

9. The following table shows the increase in distribution of cotton seed to natives from 1923 onward (at the time of writing the distribution for the 1925 crop is completed):—

COTTON SEED DISTRIBUTION TO NATIVES.

| District. | 1923. | 1924. | 1925. |
|---|---|---|---|
| | Tons. | Tons. | Tons. |
| Arusha ... ... ... ... ... | 2¾ | 1 | 1½ |
| Bagamoyo ... ... ... ... ... | 25 | 34 | 37 |
| Bukoba ... ... ... ... ... | 2 | 20 | 1 |
| Dar es Salaam ... ... ... ... | 4 | 13 | 25 |
| Iringa ... ... ... ... ... | — | — | 1¼ |
| Kilwa ... ... ... ... ... | 20 | 60 | 81 |

COTTON SEED DISTRIBUTION TO NATIVES, *(Contd.)*.

| District. | 1923. | 1924. | 1925. |
|---|---|---|---|
| | Tons. | Tons. | Tons. |
| Lindi ... ... ... ... ... | 113 | 160 | 340 |
| Mahenge ... ... ... ... ... | 3 | 5 | 22¾ |
| Morogoro ... ... ... ... ... | 84 | 208 | 199 |
| Moshi ... ... ... ... ... | 3¼ | 8 | 11¼ |
| Mwanza ... ... ... ... ... | 140 | 338 | 447 |
| Pangani ... ... ... ... ... | 3 | 8 | 50 |
| Rufiji ... ... ... ... ... | 70 | 120 | 164 |
| Rungwe ... ... ... ... ... | — | — | 5 |
| Tabora ... ... ... ... ... | 10 | 68 | 200 |
| Tanga ... ... ... ... ... | ½ | 2 | 8 |
| Usambara ... ... ... ... ... | ¾ | 2 | ½ |
| Total ... ... ... ... | 481¼ | 1,047 | 1,594¼ |

The above figures represent the total distribution to natives in the years mentioned. The total sowings by non-natives for the 1925 crop are shewn in the table below, which distinguishes between Government issues and private sources of supply.

COTTON-PLANTING BY NON-NATIVES IN 1925.

| District. | Seed in tons. Government issue. | Private supply. |
|---|---|---|
| Arusha ... ... ... ... ... ... | | 11¼ |
| Bagamoyo ... ... ... ... ... | | 1 |
| Bukoba ... ... ... ... ... ... | | ¼ |
| Dar es Salaam ... ... ... ... ... | 42 | |
| Kilwa ... ... ... ... ... ... | 1¼ | |
| Lindi ... ... ... ... ... ... | | 6½ |
| Mahenge ... ... ... ... ... ... | | 3¼ |
| Morogoro ... ... ... ... ... ... | 305 | |
| Moshi ... ... ... ... ... ... | | 12¼ |
| Mwanza ... ... ... ... ... ... | | 5 |
| Pangani ... ... ... ... ... ... | | 4 |
| Rufiji ... ... ... ... ... ... | 28¾ | |
| Tabora ... ... ... ... ... ... | | 5 |
| Usambara ... ... ... ... ... | | 16½ |
| Totals | 377 | 65 |
| Grand Total | 442 tons | |

10. *Ploughing.*—Encouraging progress is to be recorded in the extension of ploughing among natives which was begun in 1923. An additional school was found to be necessary in the Shinyanga sub-district of Tabora, making schools at Kizumbi and Samuye, and new schools were opened at Itende in Mwanza district and Nzega in the Nzega sub-district of Tabora. Owing to depletion of ploughing staff at Shinyanga by illness, it became necessary to transfer the European instructor at Nzega to Shinyanga; the instruction at Nzega, however, was carried on by a trained native. At Shinyanga it was considered advisable to confine the issue of ploughs in 1924 to 100, which required the training of 800 oxen and 200 ploughmen and drivers. In Mwanza district, the number of ploughs intended to be issued was restricted to 30 in this, the first year of instruction, and at Nzega to 25. Serious difficulties were encountered at the outset of the instruction due to depletion of staff by illness and the poor condition of the cattle at the end of an unusually long dry season. These curtailed the period of instruction, already rendered brief in ordinary seasons by the short interval between the opening of the rains in September and the close of the proper sowing season in January. At Shinyanga these difficulties gave way to the persistent personal efforts of the District Agricultural Officer (Mr. A. Pitcairn) who, in addition to long daily hours of supervision at one school or the other, supplemented the actual instructional services in person, thus enabling the full programme for the season to be expeditiously completed.

11. At Mwanza, the opening of the season's rains was belated and it was not possible to complete the original programme of issue of 30 ploughs, with trained personnel and oxen. The number issued was 28. At Nzega, owing to similar circumstances and the prohibition of cotton growing for a season (see paragraph 72) training was given for the working of 17 ploughs only; repayment of the cost of the ploughs was postponed for one year and the ploughs were returned for storage on completion of ploughing. The natives are allowed two years for full repayment. The total acreages ploughed for 1925 crops have been as follows:—

| | |
|---|---|
| Shinyanga ... ... | 1,500 acres |
| Nzega ... ... ... | 50 ,, |
| Mwanza ... ... | 270 ,, |

The services of the Senior Commissioner, Mwanza, and the Administrative Officers, Shinyanga and Nzega, by whom the Agricultural Officers have been well assisted in this, as yet, new venture in improving and increasing crop production, were of the most important kind. Much of the preliminary work of organisation of the instruction and the distribution of ploughs necessarily falls upon these Administrative Officers, including the provision of workers for the establishment of the schools and the sending forward of natives and cattle for instruction.

12. *Coffee Cultivation by Natives in the Moshi District.*—It has now been possible to make arrangements for the bringing of the native coffee industry in this district under complete Government control and supervision. Thirteen nurseries under such control are in existence in addition to a number of private native nurseries which are to receive periodical inspection for the uprooting of weak and diseased seedlings and the prevention of sale of seedlings without permit. It is intended to replace the private with further central Government nurseries. The native coffee growers' associations have reached a stage in their organisation justifying the opening of a central office at Moshi for the issue of circulars, orders and permits, the preparation of reports and statistics and in general the transaction of affairs common to the associations. This central office is to be opened in July, 1925, and will be under the supervision of this Department, though the expenditure connected with it is to be borne entirely by the native associations. It would appear to be no long step from this stage to co-operation for preparation, grading and marketing of the berry, and means for these are being devised; but the time is not yet ripe for the control of this activity by the producers themselves. The production by natives of coffee (hulled) in the last season amounted to 75 tons. The following table indicates the progress since 1916:—

| | 1916. | 1922. | 1923. | 1924. |
|---|---|---|---|---|
| Number of planters ... ... | ? | 592 | 1,400 | 3,320 |
| Bearing trees ... ... ... | 37,153 | 36,265 | 68,714 | 141,138 |
| Immature trees ... ... ... | 51,194 | 142,155 | 304,478 | 573,007 |
| Total number of trees ... ... | 88,347 | 178,420 | 373,192 | 714,145 |

All native coffee plots are under the supervision of the District Agricultural Officer, the Coffee Officer mentioned in the third paragraph of this report, and a staff of five trained African instructors; there is no hap-hazard planting, and the number of trees permitted to be planted by each farmer is now limited to one thousand. The 4,000 to 5,000 farms have all been visited by the Coffee Officer, under whose supervision and that of the instructors all new plantings are made, and who ensures the removal of diseased trees, especially those crowded together in plantations originally made too closely, and takes care that the latter are not replaced. All planting of coffee by natives is voluntary; and it is discouraged among them in cases where it is uncertain that it can be carried out to the satisfaction of the responsible Agricultural Officers.

13. *Native Coffee Growing in Arusha District.*—In the adjoining district of Arusha the small native coffee industry has likewise been brought under the supervision of the Department, this district with Moshi falling under a single agricultural officer. The organisation at Moshi has not yet been extended to Arusha. The number of trees in native ownership in the latter district is 49,491.

14. *Potato-growing on the Central Railway.*—Improvement of the quality of potatoes grown in the Uluguru Hills, near Morogoro, has considerably extended with the wider distribution of the fresh strain imported from Kenya in 1923. A similar method of improvement has been begun in the Kasulo Hills, in Kigoma. The object is to provide once again the supply of the palatable tuber existing prior to the war for the Dar es Salaam market, which at present draws 75 per cent. of its supplies from Kenya Colony.

15. In 1921, the spectacle of field after field of neglected rubber (Ceara) and sisal, a legacy of the war, betrayed the condition of non-native agriculture. The coffee industry had suffered in the same way though in lesser degree. Non-native cotton planters were very few in number. On the coast, the coconut plantations had largely reverted to bush. To-day the neglected rubber plantations, for the most part, are no longer a potential asset, for the neglect has gone too far for profitable reclamation unless the price of Ceara rubber remains at a high level. Certain individual plantations on the Tanga line, however, have been cared for and with the recent rise in the market export from these has begun. Few unreclaimed sisal plantations are left and in all sisal areas fresh plantings are in evidence. Coffee plantations have entirely recovered their former condition; in this industry fresh plantings began as early as 1921. The coconut plantations were brought under Government regulation: a course which is rapidly improving their condition.

16. This recovery of the non-native agricultural industries followed the sales of the ex-enemy properties which began in 1921; because of low prices for agricultural products in 1921 and 1922, the progress was retarded; the impetus came with the improved prices which began to be the rule in 1923. At the end of 1924, the total area of land disposed of was 1,068,665 acres, consisting chiefly of developed, or partially developed properties. Of the investment in these, 51.77 per cent. represents British capital and 30.05 per cent. Indian. In addition to the ex-enemy sales, the Government has disposed of land on long lease to the extent of 21,854 acres. The progress of non-native production may be partly judged from the figures for coffee and sisal given in the table under paragraph 56. In addition, non-natives produced 35.7 per cent (1,632,994 lb of lint) of the total cotton production of 1923 and 37.3 per cent. (2,802,954 lb of lint) of that of 1924.

17. It cannot be pretended that the Department has contributed greatly to this progress in a direct manner. There has been no personal direction or care of non-native agriculture, as there has been of native by the District Agricultural Officers. In the nature of things, this could not have been expected. The native industries have been very badly in need of supervision and repair; the non-native much less so, except in the matter of insect pests. With its meagre staff in the past, the stationing of officers has had to be confined almost entirely to districts of large native production, in which, except recently Morogoro, there have been few non-native planters. The Moshi district, however, has had an Agricultural Officer, since 1921, with absences due to leave or transfer and temporary inability to replace. The assistance which the Department has been able to give has consisted of advice, personally, when possible, and by correspondence; press articles in the *Dar es Salaam Times;* securing of new strains of seed, upon request, for experimental planting by growers themselves, distribution of cotton seed in certain areas (see paragraph 9); visits by the Entomologist, as circumstances allowed, for study of local pests with a view to their control; legislative enactments and inspection following thereon to prevent the entry of foreign pests and diseases.

18. *Improvement in the Quality of Cotton.*—The departure of the staff of the Empire Cotton Growing Corporation during the year has not put an end to the work of selection for improvement of quality which has been its main labours in the Territory. The material, as left by the Cotton Specialist at the close of the 1924 season, has been taken over by the Department and planted, for continuance. The Corporation's report on the selections of 1923, planted in 1924 and sent to London for examination, has just come to hand, so that it is possible to discard those selections that are not of value for further attention.

19. Of the samples of cotton from the leading districts sent to the Imperial Institute for examination, the report in respect of nine samples from Mwanza district only has been received at the time of writing. The report indicates the maintenance of the quality of 1923, which had been improved upon that of 1922 by the replacement of the old stocks of seed with fresh seed of first quality from Uganda. The length of lint is variable, with an average of 1·2 inches; the strength is good; the ginning yield varies from 31 per cent to 34 per cent but in the case of the higher yields allowance must be made for immature fibre, which is present in all samples, but only slightly in those of lower yield; the lint is described as soft, lustrous, of pale cream colour.

20. For other districts it is possible to give the brokers' reports (with which the Department has been favoured by local buyers) of consignments of cotton from a number of districts. These are as follows:—

| Source. | Kind. | Quality. | Number of bales. | Report. |
|---|---|---|---|---|
| Shinyanga (Tabora) ... | — | I | 111 | Clean and bright, staple 1⅛ inches, a little irregular |
| Ngerengere (Morogoro) | Native | I | 2 | Fairly nice cotton, average 1 1/16 in. |
| do. | Planters' | I | 61 | Beautiful clean cotton, strong 1 3/16 in. staple |
| do. | do. | III | 15 | Rather mixed, considerable yellow stain, fair staple |
| do. | Planters' | I | 4 | Fairly nice cotton, average 1 1/16 in. |
| Kimamba ... ... | Native | II | 52 | Nice clean cotton, strong 1 3/16 in. |
| Kahama ... ... | do. | II | 36 | Clean bright cotton, rather creamy colour, average 1¼ in. staple |
| Morogoro ... ... | do. | I | 36 | Beautiful clean cotton, strong 1 3/16 in. staple |
| do. | do. | II | 172 | Very nice clean, silky cotton 1 3/16 in. staple |
| Kilosa ... ... ... | Native and Planters' | III | 91 | Fairly bright in colour, some yellow stains, staple very mixed and weak |
| Tanga ... ... ... | Planters' | II | 78 | Bright colour but slightly stained, rather mixed staple average 1 3/16 in. |
| do. | Planters' | III | 18 | Very mixed, rain damaged cotton, much waste 1 1/8 in. staple |
| do. | do. | I | 175 | Nice clean cotton but a little seed and leaf, good strong staple |
| Moshi ... ... ... | Native | I | 67 | Beautiful clean silky cotton, average 1¼ in. |
| do. | do. | II | 33 | Rather mixed and stainy, fair staple |
| do. | do. | I | 5 | Clean white silky cotton, rather irregular staple, average 1¼ in. |
| do. | do. | II | 7 | Very stained and wasty, weak and irregular staple |

| Source. | Kind. | Quality. | Number of bales. | Report. |
|---|---|---|---|---|
| Kilimanjaro ... ... | Planters' | I | 78 | Clean white silky cotton, rather irregular staple, average 1½ in. |
| do. | do. | II | 52 | Fair amount of yellow stain, a little leaf and seed, strong 1 3/16 in. staple |
| Lindi and Morogoro ... | Native | I | — | Very even-running cotton; but slight differences in staple and colour in nearly every consignment |
| do. | Planters' | I | — | Quality rather unreliable; apparently not sorted; different qualities in almost every bale |
| do. | — | III | — | Very stained; on basis 1st grade, sold at 450 to 350 points off |

These reports show the general superiority of the native grown cotton over that raised on non-native estates; and indicate that unless considerably more care is taken to sort the latter into its different qualities and sell it and ship it as such, the good name that Tanganyika cotton has already come to bear will be damaged.

21 *Press Articles.*—In addition to the regular monthly contribution to the Government periodical for natives (*Mambo Leo*), fifteen articles on agricultural and entomological subjects were published in the *Dar es Salaam Times* during the year as well as regular reports of crop conditions in different parts of the Territory during the growing season.

22. *Experiments.*—This form of work for improvement of crop production is carried out at the Department's stations at Morogoro (in the Central Area) and Mpanganya (in the Rufiji district). The work during 1924 is recorded in the section beginning with paragraph 38. Steps are being taken for the opening of two new experiment stations, one each in the southern coastal and north-western areas. A further present intention is to open an area for intensive experimentation for dry conditions in Dodoma; and it is hoped that increase of staff will shortly give the facility for experimental and other work in Kasulo Sub-district of Kigoma.

## MARKETING IMPROVEMENT AND EXTENSION.

23. The work of this kind under the direct control of the Department is confined to the native cotton crop. Since the inception of the Department at the end of 1920, the system favoured has been that of regular auction sales during the picking season, conducted by an Agricultural Officer assisted by native instructors. The system has had the advantage of encouraging, with much success, the sorting of the cotton by natives into the three qualities provided for (based on cleanness), which are separately auctioned. It has also given the native that protection of fair weighing and full payment in cash which has been necessary for the securing of full market value in order to encourage increased production. This system was again used in 1924. It has become apparent, however, in the more important cotton districts that a change is now needed, for the production has exceeded the capacity of the local staff to handle it in this manner. During 1924, in certain districts, the Administrative Officer lent the aid of his staff and frequently of his own services in order to assist the Agricultural Officer to cope with an overwhelming number of growers bringing their cotton to the sales. Thus in the space of four years the auction markets have served their purpose in these districts and have contributed very largely to a condition which necessitates their termination. The substitution is to be

by a system which will permit daily sales at approved stores, licensed for the purpose and aggregated at appointed centres. It is believed that the knowledge which the native has gained, coupled with the ordinary force of competition among the buyers, together with the existence of a simple scheme of inspection under the Cotton Rules, will maintain the advantages already established by the auction system, those of sale by quality and full market value. In the districts of lesser production, the auction system will continue. A summary of the conditions and statistics of the different markets during 1924 is given in the following paragraphs under the names of the districts concerned. The figures of value, representing actual cash received by the natives, are of interest in showing to what extent cotton contributes to their prosperity and purchasing power in those districts. The local prices are given in the table in paragraph 36.

24. *Morogoro.*—This district had already shown too large a production in 1923 to continue a system of periodical auction sales. The system was therefore widened by holding the auctions weekly at Morogoro for deliveries to be made daily at four centres in the district during the week ensuing, and each week's prices were communicated to natives throughout the district. The appointment of four supervisors at the centres of delivery was necessary; these did the daily work of weighing and determination of quality, in addition to general supervison, which had been the duty of a single agricultural officer at the periodical markets in previous years. The following are the total figures of sales (of unginned cotton) during the season separately for the sub-districts of Morogoro and the districts adjoining that of Morogoro from which cotton was received at the centres for sale:—

| District. | 1st quality. | 2nd quality. | 3rd quality. | Total. | Value. |
|---|---|---|---|---|---|
| | Kgs. | Kgs. | Kgs. | Kgs. | Shs. |
| Morogoro (Sub-district) ... ... | 716,874 | 123,491 | 197,346 | 1,037,711 | 644,523 |
| Kilosa ... ... | 577,424 | 267,320 | 282,925 | 1,127,669 | 631,426 |
| Total | 1,294,298 | 390,811 | 480,271 | 2,165,380 | 1,275,949 |
| Mahenge ... ... | 2,103 | 4,368 | 2,744 | 9,215 | 4,216 |
| Bagamoyo* ... ... | 91,306 | 31,853 | 16,769 | 139,928 | 75,774 |
| Total deliveries Morogoro district sales ... ... | 1,387,707 | 427,032 | 499,784 | 2,314,523 | 1,355,939 |

It will be seen that the natives of Morogoro district alone derived an income in excess of £63,000 for the crop of 1924. The following figures indicate the progress in this district since 1922:—

| | 1922. | 1923. | 1924. |
|---|---|---|---|
| Weight in tons of unginned cotton ... | 149 | 645 | 2,165 |
| Value in £ ... ... ... ... | 3,170 | 22,918 | 63,797 |

25. *Lindi.*—Periodical auction markets were held at six centres: Lindi, Mikindani and Mchinga on the coast, and Mingoyo, Mtama and Ndanda on the light railway in the interior. The figures for Mikindani Sub-district are shewn separately from the remainder, which fall under Lindi.

| District. | 1st quality. | 2nd quality. | 3rd quality. | Total. | Value. |
|---|---|---|---|---|---|
| | Kgs. | Kgs. | Kgs. | Kgs. | Shs. |
| Lindi ... ... | 254,992 | 101,520 | 79,641 | 436,153 | 223,014 |
| Mikindani ... ... | 98,121 | 27,535 | 36,655 | 162,311 | 86,589 |
| Total for Lindi district ... ... | 353,113 | 129,055 | 116,296 | 598,464 | 309,603 |

The total in 1923 for the district was 237,422 kgs., of a value of Shs. 135,519.

*See also paragraph 29.

26. *Kilwa.*—Auction markets were held at Kilwa and Kikanda. The yields were light, owing to the dry season. The following figures apply to the whole district, and figures for 1923 are given for comparison:—

| | 1st quality. | 2nd quality. | 3rd quality. | Total. | Value. |
|---|---|---|---|---|---|
| | Kgs. | Kgs. | Kgs. | Kgs. | Shs. |
| 1923 ... ... ... | 73,033 | 55,449 | 40,712 | 169,194 | 59,620 |
| 1924 ... ... ... | 57,444 | 46,751 | 30,188 | 134,383 | 66,345 |

27. *Rufiji.*—Auction markets were held at Mtanza and Kilimani, in Western Rufiji and Mohoro and Kikale in Eastern Rufiji, with the following results:—

| | 1st quality. | 2nd quality. | 3rd quality. | Total. | Value. |
|---|---|---|---|---|---|
| | Kgs. | Kgs. | Kgs. | Kgs. | Shs. |
| Western Rufiji ... | 318,666 | 47,684 | 29,817 | 396,167 | 131,855 |
| Eastern Rufiji ... | 69,064 | 29,285 | 12,004 | 110,353 | 54,965 |
| Total | 387,730 | 76,969 | 41,821 | 506,520 | 186,820 |

In 1923, the total output for Western Rufiji was 303,586 kgs. and for Eastern 46,241 kgs., a total of 349,827 kgs. at a value of Shs. 123,707.

28. *Dar es Salaam.*—Auction markets were held in this district for the first time, at Dar es Salaam. The figures were:—

| 1st quality. | 2nd quality. | 3rd quality. | Total. | Value. |
|---|---|---|---|---|
| Kgs. | Kgs. | Kgs. | Kgs. | Shs. |
| 56,961 | 59,461 | 14,782 | 131,204 | 75,147 |

29. *Bagamoyo.*—This was the first year of auction markets in the district and these were held at Bagamoyo only. Part of the crop, however, was sold at Ngerengere, in the Morogoro district (see para. 24). The figures which follow cover the whole of the district crop, and those for 1923 are given for comparison:—

| | 1st quality. | 2nd quality. | 3rd quality. | Total. | Value. |
|---|---|---|---|---|---|
| | Kgs. | Kgs. | Kgs. | Kgs. | Shs. |
| 1923 ... ... ... | 58,948 | 17,756 | 8,417 | 85,121 | 36,209 |
| 1924 ... ... ... | 238,929 | 141,062 | 37,231 | 417,222 | 237,016 |

30. *Pangani.*—Auction markets were held at Pangani, for the first time in this district, with the following results:—

| 1st quality. | 2nd quality. | 3rd quality. | Total. | Value. |
|---|---|---|---|---|
| Kgs. | Kgs. | Kgs. | Kgs. | Shs. |
| 41,514 | 82,282 | 19,854 | 143,650 | 82,246 |

31. *Tabora.*—Cotton buying was also done in this District, for the first time, by means of auction markets. Four centres were appointed in the Shinyanga Sub-district and one at Kahama. In the former, in addition, the ginnery was permitted to purchase in competition with the markets. Deliveries at the ginnery could be made daily and the markets were held monthly, the ginnery offering prices equal to those bid at the markets. The following are the figures of total sales, shewn separately for the two sub-districts:—

| | 1st quality. | 2nd quality. | 3rd quality. | Total. | Value. |
|---|---|---|---|---|---|
| | Kgs. | Kgs. | Kgs. | Kgs. | Shs. |
| Shinyanga ... ... | 106,724 | 50,191 | 46,504 | 203,419 | 119,671 |
| Kahama ... ... | 3,483 | 14,772 | 16,550 | 34,805 | 12,436 |
| Total for Tabora District ... | 110,207 | 64,963 | 63,054 | 238,224 | 132,107 |

The total for Kahama includes 996 kgs. produced in the adjoining sub-district of Nzega, in the same district. The Shinyanga sub-district in 1923 produced 47,739 kgs. at a value of Shs. 16,692.

32. *Mwanza.*—Two methods of sale were adopted in this district. The bulk of the crop was sold at specially appointed buying centres to licensed buyers; the remainder at auction markets on the fringe of the cotton area where as yet, insufficient buying competition existed locally. The auctions were held at four centres namely Jalikungu, Nassa, Nyakabindi and Luguru, with the following results:—

| 1st quality. | 2nd quality. | 3rd quality. | Total. | Value. |
|---|---|---|---|---|
| Kgs. | Kgs. | Kgs. | Kgs. | Shs. |
| 57,752 | 3,596 | 6,076 | 67,424 | 32,922 |

At the ordinary buying centres, where two grades only were used, the total purchases were:—

| 1st quality. | 2nd quality. | Total. | Value. |
|---|---|---|---|
| Kgs. | Kgs. | Kgs. | Shs. |
| 2,163,390 | 362,085 | 2,525,475 | 1,496,273 |

The grand total for the district was thus kgs. 2,592,899 at a value of Shs. 1,529,195.

33. *Bukoba.*—Auction markets were held for the first time in this district, in which the production has until now been in the experimental stage. The following were the figures of sales (two grades only were used):—

| 1st quality. | 2nd quality. | Total. | Value. |
|---|---|---|---|
| Kgs. | Kgs. | Kgs. | Shs. |
| 38,560 | 43,011 | 81,571 | 38,110 |

34. *Moshi.*—In this district it was necessary to dispose of the crop by private agreement at arranged prices. The figures of sales were as follows:—

| 1st quality. | 2nd quality. | 3rd quality. | Total. | Value. |
|---|---|---|---|---|
| Kgs. | Kgs. | Kgs. | Kgs. | Shs. |
| 82,145 | 13,746 | 2,880 | 98,771 | 57,001 |

The sales in 1923 amounted to 46,215 kgs. at a value of Shs. 25,039.

35. In the districts of Tanga, Arusha, Usambara and Songea the industry was still in the experimental stage; and lack of staff caused the sales to be uncontrolled.

36. The table below serves to show the range of prices at the different auction markets during the year. The prices are in cents of a shilling per kilogram. By 1st quality is meant clean white cotton; 2nd quality, lightly stained or slightly dirty cotton; 3rd quality all other merchantable cotton.

| District and centre. | 1st quality. | | 2nd quality. | | 3rd quality. | |
|---|---|---|---|---|---|---|
| | Max. | Min. | Max. | Min. | Max. | Min. |
| Morogoro ... ... | | | | | | |
| Morogoro ... ... | 94 | 50 | 84 | 40 | 47 | 25 |
| Ngerengere ... | 88 | 50 | 78 | 40 | 44 | 25 |
| Kimamba ... ... | 92 | 50 | 82 | 40 | 45 | 25 |
| Kilosa ... ... | 94 | 50 | 84 | 40 | 47 | 25 |
| Lindi ... ... ... | | | | | | |
| Lindi ... ... | 71 | 47 | 67 | 36 | 52 | 26 |
| Mingoyo ... ... | 71 | 46 | 67 | 35 | 51 | 24 |
| Mtama ... ... | 66 | 40 | 63 | 29 | 49 | 20 |
| Ndanda ... ... | 68 | 34 | 61 | 24 | 47 | 16 |
| Mikindani ... ... | 89 | 45 | 79 | 35 | 65 | 24 |
| Mchinga ... ... | 75 | 47 | 68 | 35 | 55 | 20 |
| Kilwa ... ... ... | | | | | | |
| Kilwa ... ... | 83 | 71 | 80 | 56 | 62 | 36 |
| Kikanda ... ... | 60 | 40 | 50 | 30 | 40 | 20 |
| Rufiji ... ... ... | | | | | | |
| Kilimani ... ... | 47 | 35 | 42 | 30 | 32 | 18 |
| Mtanza ... ... | 53 | 35 | 48 | 30 | 38 | 18 |
| Mohoro ... ... | 66 | 45 | 61 | 40 | 51 | 23 |
| Kikale ... ... | 40 | 35 | 35 | 30 | 25 | 18 |
| Dar es Salaam | | | | | | |
| Dar es Salaam ... | 101 | 55 | 91 | 45 | 50 | 20 |
| Bagamoyo | | | | | | |
| Bagamoyo ... ... | 77 | 55 | 67 | 45 | 38 | 25 |
| Pangani | | | | | | |
| Pangani ... ... | 77 | 61 | 67 | 51 | 38 | 30 |
| Tabora | | | | | | |
| Kahama ... ... | 70 | 68 | 61 | 40 | 39 | 22 |
| Tinde ... ... | 75 | 68 | 50 | 46 | 39 | 33 |
| Ngungu ... ... | 70 | 68 | 57 | 57 | 35 | 33 |
| Mwanza. | | | | | | |
| Jalikungu ... ... | 64 | 44 | 42 | 33 | 42 | 22 |
| Nassa ... ... | 61 | 44 | 44 | 31 | 31 | 22 |
| Nyakabindi ... ... | 55 | 46 | 37 | 31 | 26 | 22 |
| Luguru ... ... | 50 | 48 | 33 | 31 | 28 | 22 |
| Bukoba | | | | | | |
| Bukoba ... ... | 55 | 44 | 44 | 37 | — | — |

37. *Auction Sales of Other Produce.*—The Department has no administrative connection with these sales, which are organised and controlled by the officer administering the district, but it endeavours to encourage the adoption of the method for native export products wherever the auctions are regarded as suitable. In the Dodoma, Bagamoyo and Morogoro districts, these auction sales have been established for two years or longer and have proved most successful,. At Bagamoyo, in 1924, auction sales of copra realised £2,000 for 614 tons and of gum copal £2,310 for 22 tons. In the Dodoma district, 2,695 tons of groundnuts were sold by auction, realising for the natives £43,122. Morogoro auction sales of rice, simsim, beans, millets and flour realised £10,865 for 770 tons. The system has also been adopted by the Senior Commissioner, Kigoma, where the export from the district is as yet low although increasing; in 1924, the sale of millets, simsim and groundnuts amounted to 60, 52 and 62 tons, respectively.

## WORK IN STATIONS, GARDENS AND PLOTS.

38. The experimental work at the Morogoro station continues to be confined to a limited number of trials owing to the circumstance that the officer in charge is responsible as well for the increasing district work. At the Mpanganya station (Rufiji) the officer in charge of the Empire Cotton Growing Corporation's selection work (Mr. T. McEwen) continued to superintend the adjoining few plots of cotton experiments initiated by the Department. The Amani Institute is still being maintained on a caretaking basis. At the Botanic Gardens, Dar es Salaam, improvement and extension accompanied the work of maintenance; and these Gardens have already attained a special usefulness in the important work of the introduction of new plants into the Territory.

## Morogoro Agricultural Station.

39. *Cotton Variety Trials.*—There were in addition trials for maturity. The following upland varieties were planted on March 13: Uganda, Nyasaland, Zululand Hybrid (these three being established African varieties), and the following American varieties: Bancroft Seedling, Early King, Durango, Acala and Lone Star. Another American variety, Over-the-top, was sown on March 21. The following was the order of place for earliness of maurity and yield:—

| Variety. | Maturity. | Yield. |
|---|---|---|
| Uganda ... ... ... | IV | V |
| Nyasaland ... ... ... | IV | VI |
| Zululand Hybrid ... ... | II | VIII |
| Bancroft Seedling ... ... | I | IV |
| Early King ... ... ... | III | III |
| Durango ... ... ... | I | I |
| Acala ... ... ... ... | III | VI |
| Lone Star ... ... ... | I | II |
| Over-the-top ... ... ... | II | VII |

The periods for attaining maturity were judged from the date of germination to the date of the first large picking. On the basis of last large picking, Over-the-top was placed first, being earlier in date than the others by six days, though planted later by eight days, a difference of two weeks in its favour. The period between germination and date of last large picking in the case of Over-the-top was 217 days; for the remainder 230 and 231 days. It has to be stated that throughout the Territory the crop is planted in the late summer or early autumn and in some districts (including Morogoro) a retardation of growth occurs during the winter month of July.

40. *Cotton: Time of Sowing Experiment.*—Sowings were made at fortnightly intervals from February 8 to March 22, with the following results:—

| Date of planting. | Rainfall during month. | Comparative yield. |
|---|---|---|
| February 8 ... ... | February 261 mm. | 100 |
| do. 22 ... ... | March 153 mm. | 82 |
| March 7 ... ... | April 207 mm. | 26 |
| do. 22 ... ... | May 77 mm. | 9 |

This was the third year of the experiment. The results over the three years have varied greatly in respect of date. Correlation of this variation with that of the dates of opening of the sustained rainy season is shewn in the following table:—

| Year. | Date of best planting. | Date of opening of sustained rainy season. |
|---|---|---|
| 1922 ... ... ... ... | February 20 | March 8 |
| 1923 ... ... ... ... | March 21 | March 22 |
| 1924 ... ... ... ... | February 8 | February 1 |

It should be stated that in 1922 good planting rains occurred in the second week of February (69 mm.) followed by a dry period until March 8. The results also make the indication, which old planters in the region aver to be a fact, that the completion of maturity of the annual crop occurs at the same time, no matter at what date during February or March the crop is sown (it being understood that the same variety and strain are used in all sowings). This would seem to indicate that the retardation during July is of boll-forming and that all plants, after the check, begin an equal advance towards maturity, the difference in condition at the time of the check, however, resulting in difference of yields; not, so far as is observable, of quality. These points will receive further investigation. What appears to be already clear from the experiments is that a long sowing season (from the first week of February to the last week of March, at Morogoro) is enjoyed during which the optimum time of sowing is with the commencement of the heavy rainy season, and that postponement of maturity need not be feared with late plantings at such optimum time, provided that its coming is not delayed beyond the third week in March. The latter is important in view of the strict uprooting measures necessary to be enforced in this district, in which the pink bollworm exists.

41. *Cotton: Distance of Sowing Experiment.*—All plots were sown on the same date. The distances were 3 feet between the rows in each case and 9, 15, 18 and 24 inches between the single plants (after thinning) in the rows in the different plots. The results agree with those of 1923—a progressive decline in yield with the wider spacings. In 1922 there was a similar decline, except for the 9 inch plot, which gave the lowest yield. Seed-cotton from the various plots was sent to the Imperial Insitute for examination of any differences in quality, and an interesting report is summarized by the Institute as follows: "No appreciable difference could be detected in the general characters of these four samples of cotton, which were all of similar strength and length, of good appearance, and free from stains." The variation in the spacing of the plants had therefore no noticeable effect on the quality of the cotton. The experiment is being continued; and following an examination of the cottons of 1925, if corroboration of the report of 1924 is received, the full annual results will be published. Failing corroboration, the experiment will be continued.

42. *Cotton: Purity of Seed Test.*—This test was begun in 1922. Seed of five types were found in the old seed then in use. These were: (1) black naked; (2) with green fuzz; (3) with normal white fuzz; (4) with cream fuzz; (5) with abnormal amount of white fuzz. Selections of the same types from the resultant seed were sown from year to year, in adjoining plots of 1/10 acre each. In 1922, the type sown predominated in the result; by 1924 the normal white fuzzy type predominated in all results. The following are the figures:—

| Type of Seed. | Results in Percentages. | 1922. | 1924. |
|---|---|---|---|
| (1) Black, naked ... ... ... ... | No. 1 ... ... | 49 | 16 |
| | ,, 2 ... ... | 5 | 0 |
| | ,, 3 ... ... | 26 | 64 |
| | ,, 4 ... ... | 16 | 18 |
| | ,, 5 ... ... | 4 | 2 |
| (2) With green fuzz ... ... ... ... | ,, 2 ... ... | 43 | 2 |
| | ,, 3 ... ... | 11 | 77 |
| | ,, 4 ... ... | 38 | 13 |
| | ,, 5 ... ... | 3 | 1 |
| | ,, 1 ... ... | 5 | 7 |
| (3) With normal white fuzz ... ... ... | ,, 3 ... ... | 52 | 77 |
| | ,, 4 ... ... | 39 | 10 |
| | ,, 5 ... ... | 6 | 3 |
| | ,, 1 ... ... | 3 | 7 |
| | ,, 2 ... ... | 0 | 3 |
| (4) With cream fuzz ... ... ... ... | ,, 4 ... ... | 52 | 24 |
| | ,, 5 ... ... | 1 | 2 |
| | ,, 1 ... ... | 5 | 5 |
| | ,, 2 ... ... | 6 | 1 |
| | ,, 3 ... ... | 36 | 68 |
| (5) With abnormal amount of white fuzz ... | ,, 5 ... ... | 51 | 14 |
| | ,, 1 ... ... | 0 | 4 |
| | ,, 2 ... ... | 0 | 1 |
| | ,, 3 ... ... | 0 | 75 |
| | ,, 4 ... ... | 43 | 6 |

43. *Sorghum Millets.*—Eleven varieties of sorghums from the Sudan, of dwarf character, were sown in plots adjoining two local varieties, which are of exceptional tallness. The maturity was very much earlier than that of the latter, but the plants were destroyed by an attack of rust of unusual severity. The disease was also apparent in the local varieties, which were able, however, to withstand it. Dwarf varieties have been imported from the United States for trial in 1925. Local sorghums are subject more to smut than to rust and the annual loss is heavy. The object of the trials is to replace the tall varieties, which have deteriorated, by superior-yielding and smut-resistant dwarf varieties.

44. *Beans.*—An attempt is being made to introduce the Madagascar butter bean into native cultivation. The experiments at Morogoro show that it bears well, even in a comparatively dry season, when staked; when not staked, the growth is equally profuse, but the yields are considerably less. It is well adapted to the local conditions (for non-native planters) as a smother crop or for the purpose of green-manuring. Varieties of white Lima and white haricot beans are also under trial.

45. *Orchards and Nurseries.*—The orchards are under reorganisation for the planting of fresh material and elimination of certain sections of little use. The station nursery and that maintained for the Dar es Salaam Botanic Gardens have been merged, and a new potting shed erected. The following issues of seeds and plants were made during the year: seed 92 packets, plants (single) 264, planting material (cuttings, etc., in bulk) 56 packages

## Mpanganya Agricultural Station.

46. The experimental work at this station is for the present limited to cotton, and continues to be restricted in extent owing to shortage of staff. During the absence of the District Agricultural Officer on leave, the Cotton Specialist kindly permitted his resident Assistant, Mr. T. McEwen, to take charge of the work until the end of June. It will be remembered that this station was in 1922 placed at the disposal of the staff of the Empire Cotton Growing Corporation for its selection work.

47. The District Agricultural Officer reports that the variability of the soil was manifest this year in the same manner as described in the last Annual Report. Steps are now being taken for the acquisition of land of more uniform character adjoining the station in order to add to the areas suitable for experimental work in the old station, which will be used in addition for mass production of good seed. The failure of the normal rains in April affected the experiments adversely, though this circumstance does not, in certain cases, disturb the value of the results for comparison.

48. *Cotton: Time of Sowing Experiment.*—The following results were obtained:—

| Date of planting. | Rainfall during month. | Comparative yield. |
|---|---|---|
| March 24 ... ... ... | March 116 mm. | 100 |
| April 7 ... ... ... | April 42 mm. | 83 |
| do. 21 ... ... ... | | 53 |
| May 5 ... ... ... | May 25 mm. | 45 |
| do. 19 ... ... ... | | 16 |
| June 2 ... ... ... | June 45 mm. | 3 |
| | July none | |

49. *Cotton: Distance of Sowing Experiment.*—This experiment gave good indicative results, which are expressed in the following table:—

| Spacing. | Comparative yield. |
|---|---|
| 3 feet by 6 inches ... ... ... ... | 81 |
| do. 12 ,, ... ... ... ... | 96 |
| do. 18 ,, ... ... ... ... | 100 |
| do. 24 ,, ... ... ... ... | 86 |
| 2½ feet 6 ,, ... ... ... ... | 74 |
| do. 12 ,, ... ... ... ... | 81 |
| do. 18 ,, ... ... ... ... | 86 |
| do. 24 ,, ... ... ... ... | 91 |

As at the Morogoro station, the continuation of the experiment, and the adoption of any decisive result in local cotton growing practice, will depend upon the effect of closer spacing on the quality of the lint. The noticeable suppression of lower and secondary branching with the closer spacings is an important factor, both for yields and insect control.

50. *Cotton: Deep* versus *Shallow Digging.*—In this district as in many others, the ground is dug over with the hoe, normally to a depth of 5 or 6 inches. The object of this experiment was to ascertain the value of deeper digging. Two sets of duplicate plots were used, one dug to the normal depth, the other to a depth of 12 inches. The result as far as the experiment has gone showed that the beneficial effect of the deeper digging was too slight to be of any value.

## Botanic Gardens, Dar es Salaam.

51. The extension of the work of new plantings and of issues of seeds and plants is shown in the following figures:—

| | Introduction. | | Distribution. | |
|---|---|---|---|---|
| | Plants. | Seeds (Packets). | Plants. | Seeds (Packets). |
| 1923 ... | 4 | 83 | 283 | 25 |
| 1924 ... | 110 | 72 | 475 | 78 |

The figures do not include cuttings, of which two parcels were received and one parcel distributed in 1924. The more interesting of the new plantings were *Aberia caffra; Acacia albida* (A. Senegal); *Abutilon roseum*; *Bignonia speciosa*; *B. venusta*; *Bougainvillea glabra*; *B. glabra*, var. *Sanderiana*; *B. splendens*; *B. spectabilis speciosa*; *Hura crepitans*; *Ipomoea suberosa*; *Tecoma Smithii*; *Payena Leerii*; *Solanum Wendlandii*. In addition, systematic plantings of indigenous species have begun and are to be a permanent feature. Improvement of the grass in the Gardens has been begun by the substitution of better lawn varieties of indigenous species. The hedges of *Euphorbia cuneata* have been replaced by cats-claw, (*Pithecolobium Unguis-cati*).

52. In addition to this work of improvement and to ordinary maintenance in the Gardens, the street avenues in the town have received special attention and the reduction of the excessive number of trees throughout the township has been accelerated.

53. The Head Gardner also performs the duties of plant import inspector at Dar es Salaam and plantation inspector in the town and neighbourhood; and is in joint charge of the work for the improvement of the orchards at the Morogoro Agricultural Station. In the circumstances of lack of staff and emergency, this Officer assisted for the cotton auction markets at Dar es Salaam.

## Cotton Yields.

54. The following are the yields per acre of seed-cotton from measured plots in native fields:—

| District. | Number of plots measured. | Yield per acre, lb. |
|---|---|---|
| Shinyanga | | |
| Salawe sultanate ... ... | 5 | 225 |
| Kizumbi ,, ... ... | 5 | 301 |
| Western sultanates ... ... | 15 | 103 |
| Lindi | | |
| Ndanda ... ... ... | 1 | 398 |
| Rufiji | 1 | 1,012 |
| Mpanganya ... ... ... | 1 | 891 |
| Moshi | | |
| Himo ... ... ... ... | 1 | 728 |

## Agricultural Plots at Rufiji.

55. The following results were obtained from measured plots in the Rufiji district:—

| Crop. | Locality. | Yield per acre, lb. |
|---|---|---|
| Rice ... ... ... | Mpanganya | 2,134 |
| Maize ... ... ... | do. | 2,216 |

# PROGRESS OF THE CHIEF EXPORT CROPS.

56. The table referred to in paragraph 13 under the section dealing with Crop Improvement and Extension is now given as an introduction to this section and no further explanation is required in respect of its indications of progress. The present section is intended to deal with the progress of these crops in the different districts.

## PRINCIPAL EXPORTS, 1913 AND 1922-24.

| Export. | 1913. Quantity. Cwts. | 1913. Value. £. | 1913. % of total value. | 1913. Order. | 1922. Quantity. Cwts. | 1922. Value. £. | 1922. % of total value. | 1922. Order. | Value on par of 1913. £. |
|---|---|---|---|---|---|---|---|---|---|
| Sisal ... ... ... ... ... | 416,680 | 535,580 | 30·1 | I | 204,480 | 289,388 | **22·3** | I | 262,829 |
| Hides and Skins ... ... ... ... | 69,120 | 274,511 | 15·4 | III | 30,495 | 67,156 | 5·2 | VI | 121,111 |
| Cotton ... ... ... ... ... | 43,840 | 120,753 | 6·7 | IV | 30,887 | 140,750 | 10·8 | IV | 85,075 |
| Copra ... ... ... ... ... | 109,540 | 117,401 | 6·6 | V | 95,420 | 89,633 | 6·9 | V | 102,268 |
| Groundnuts ... ... ... ... | 179,220 | 95,932 | 5·3 | VI | 250,360 | 190,553 | **14·7** | III | 134,012 |
| Beeswax ... ... ... ... ... | 11,180 | 70,743 | 4·0 | VII | 6,655 | 24,792 | 1·9 | X | 42,110 |
| Coffee ... ... ... ... ... | 21,180 | 46,563 | 2·6 | VIII | 85,426 | 203,784 | 15·7 | II | 187,804 |
| Simsim ... ... ... ... ... | 29,520 | 20,407 | 1·1 | IX | 55,560 | 49,573 | 3·8 | VIII | 38,408 |
| Rice ... ... ... ... ... | 15,420 | 8,717 | 0·5 | — | 30,523 | 26,417 | 2·0 | IX | 17,255 |
| Millet ... ... ... ... ... | 18,210 | 5,498 | 0·3 | — | 200,517 | 61,898 | 4·7 | VII | 60,540 |
| Totals ... ... | 913,910 | 1,296,105 | 72·6 | — | 990,323 | 1,143,944 | 88·0 | — | 1,051,412 |
| Plantation Rubber ... ... ... | 25,740 | 309,195 | 17·4 | II | 186 | 381 | — | — | |
| Ghee ... ... ... ... ... | 6,656 | 15,400 | 0·8 | X | | | | | |

| Export. | 1923. Quantity. Cwts. | 1923. Value. £. | 1923. % of total value. | 1923. Order. | 1924. Quantity. Cwts. | 1924. Value. £. | 1924. % of total value. | 1924. Order. | Value on par of 1913. £. |
|---|---|---|---|---|---|---|---|---|---|
| Sisal ... ... ... ... ... | 256,900 | 367,228 | 22·2 | I | 368,560 | 644,835 | 24·7 | I | 473,729 |
| Hides and Skins ... ... ... ... | 41,370 | 117,554 | 7·1 | VI | 50,948 | 185,843 | 7·1 | V | 202,341 |
| Cotton ... ... ... ... ... | 29,386 | 177,710 | 10·7 | IV | 50,828 | 373,710 | 14·3 | II | 140,001 |
| Copra ... ... ... ... ... | 133,380 | 131,536 | 7·9 | V | 162,500 | 178,194 | 6·8 | VI | 174,162 |
| Groundnuts ... ... ... ... | 330,160 | 264,129 | 15·9 | II | 373,680 | 359,918 | 13·8 | III | 200,022 |
| Beeswax ... ... ... ... ... | 6,039 | 24,758 | 1·5 | X | 8,497 | 44,666 | 1·7 | X | 53,766 |
| Coffee ... ... ... ... ... | 80,937 | 204,987 | 12·4 | III | 105,222 | **352,529** | 13·5 | IV | 231,324 |
| Simsim ... ... ... ... ... | 88,700 | 75,527 | 4·6 | VII | 78,180 | 80,324 | 3·1 | VII | 54,045 |
| Rice ... ... ... ... ... | 57,721 | 41,517 | 2·5 | VIII | 62,235 | 59,866 | 2·3 | VIII | 35,182 |
| Millet ... ... ... ... ... | 121,973 | 36,095 | 2·2 | IX | 158,332 | 49,976 | 1·9 | IX | 47,804 |
| Totals ... ... | 1,146,566 | 1,441,041 | 87·0 | — | 1,418,982 | 2,329,861 | 89·2 | — | 1,612,376 |

## Cotton.

57. The table which follows is a statement of production of lint from the crops of 1922, 1923 and 1924. As ginning extends well into the year following the growing season, the production is shown to fall under the combined years. The figures represent the actual output of the districts, as shewn in the returns from ginneries. A list of ginneries is given in Appendix III.

COTTON LINT PRODUCTION (BY DISTRICTS).

| District. | In lb. 1922-23. | In lb. 1923-24. | In lb. 1924-25. | Difference, per cent. |
|---|---|---|---|---|
| Morogoro ... ... | 832,970 | 1,717,301 | 2,972,142 | + 73 |
| Mwanza ... ... | 1,160,685* | 1,807,337* | 2,128,694 | + 18 |
| Tabora ... ... ... | — † | — † | 175,894 | — |
| Lindi ... ... ... | 218,032 | 261,546 | 442,098 | + 69 |
| Kilwa ... ... ... | 39,796 | 124,905 | 111,130 | + 11 |
| Rufiji ... ... ... | 269,493 | 264,814 | 362,484 | + 37 |
| Dar es Salaam ... | 152,080 | 104,899 | 251,681 | +140 |
| Bagamoyo ... ... | 77,504 | 73,373 | 289,496 | +295 |
| Pangani ... ... | 4,950 | 1,716 | 95,025 | (High) |
| Tanga, Usambara and Moshi ... ... | 99,192 | — | — | — |
| Tanga and Usambara... | — | 154,330 | — | — |
| Moshi ... ... ... | — | 46,415 | 407,527 | (High) |
| Tanga ... ... ... | — | — | 78,291 | — |
| Usambara ... ... | — | — | 153,156 | — |
| Mahenge ... ... | 15,334 | 17,068 | 6,483 | — 62 |
| Bukoba ... ... | — | — | 40,429 | — |
| Arusha ... ... ... | | | 2,234 | — |
| Rungwe ... ... | — | — | 600 | — |
| Totals | 2,870,036 | 4,573,704 | 7,517,364 | + 64 |

*Includes Tabora.

†Included in Mwanza.

58. The succeeding table is a detailed statement of the progress of native cotton production throughout the Territory, by districts.

PRODUCTION OF COTTON LINT BY NATIVES.

| District. | Lint in lb. | Lint in lb. | | Difference, per cent. | Percentage of total district production. | | Percentage of total native production. | |
|---|---|---|---|---|---|---|---|---|
| | 1922-23. | 1923-24. | 1924-25. | | 1923-24. | 1924-25. | 1923-24. | 1924-25. |
| Morogoro ... ... ... ... | 98,666 | 448,965 | 1,472,021 | +228 | 26 | 50 | 15.0 | 31.2 |
| Mwanza* ... ... ... ... | 714,366 | 1,753,117 | 1,711,292 | | | | | |
| Tabora ... ... ... ... ... | — | — | 159,930 | + 7 | 97 | 81 | 58.7 | 39.7 |
| Lindi ... ... ... ... ... | 54,432 | 248,469 | 404,109 | + 58 | 95 | 91 | 4.5 | 8.6 |
| Kilwa ... ... ... ... ... | 39,796 | 124,905 | 88,693 | − 29 | 100 | 80 | 4.3 | 1.9 |
| Rufiji ... ... ... ... ... | 245,042 | 238,579 | 335,061 | + 40 | 90 | 92 | 8.1 | 7.1 |
| Dar es Salaam ... ... ... | 379 | 29,601 | 86,904 | +194 | 28 | 35 | 1.0 | 1.8 |
| Bagamoyo ... ... ... ... | 56,858 | 50,319 | 265,485 | +428 | 69 | 92 | 1.7 | 5.6 |
| Pangani ... ... ... ... | 4,950 | 7,725 | 95,025 | (high) | 100 | 100 | 0.05 | 2.0 |
| Moshi ... ... ... ... ... | 7,421 | 3,500 | 65,670 | + 94 | 73 | 16 | 1.1 | 1.4 |
| Bukoba ... ... ... ... ... | — | — | 14,468 | — | — | 36 | — | 0.3 |
| Mahenge ... ... ... ... | 6,681 | 7,725 | 4,980 | − 36 | 45 | 77 | 0.25 | 0.1 |
| Tanga and Usambara ... ... | 508 | 3,500 | 7,938 | +127 | 2 | 3 | 0.1 | 0.2 |
| Arusha ... ... ... ... ... | — | — | 2,234 | — | — | 100 | — | 0.05 |
| Rungwe ... ... ... ... | — | — | 600 | — | — | 100 | — | 0.01 |
| Total. | 1,229,099 | 2,940,710 | 4,714,410 | + 60 | — | — | — | — |

Percentage of total production of the Territory: 1922-23, 42.8 (Mwanza underestimated); 1923-24, 64.3; 1924-25, 62.7.
*Tabora included for 1922-23, 1923-24.

## Sisal.

59. Of 18,428 tons of sisal hemp and tow exported in 1924, 12,477 tons (67.7 per cent.) was produced in the north-eastern districts on the Tanga railway (almost entirely from the Tanga and Usambara districts). The exports of 1923 from these districts amounted to 9,394 tons; thus an increase in production in this area of about one-third is shown. Exports from the Lindi districts totalled 2,904 tons, an increase of 77 per cent. over those of 1923; from Dar es Salaam (for Dar es Salaam and Morogoro districts) 2,440 tons, an increase of 62 per cent. Districts of lesser production are Pangani, Moshi and Mwanza.

## Coffee.

60. A small increase in production in the north-eastern coffee area, comprising the districts of Arusha, Moshi and Usambara, is to be recorded: from 29,637 cwts. exported in 1923, to 31,580 cwts. in 1924 (6 per cent.). Of the latter figure, 1,500 cwts. were produced by natives. The production of the mostly native-grown coffee in the Bukoba district increased from 51,251 cwts. in 1923 to 73,620 cwts. in 1924 (43 per cent.).

## Groundnuts.

61. The figures for the three leading areas of production are as follows:—

| | 1923. Tons. | 1924. Tons. | Difference, per cent. |
|---|---|---|---|
| Mwanza (including Shinyanga) ... ... | 7,778 | 6,494 | −17 |
| Dodoma (including Kondoa Irangi) ... | 1,927 | 2,695 | +40 |
| Tabora ... ... ... ... ... | 4,529 | 8,049 | +78 |

Mwanza recorded a large increase in plantings, but suffered seriously from a bad rainy season.

## Copra.

62. All coastal districts produce copra. Of the leading districts, Tanga increased its production, from 1,548 tons in 1923 to 2,647 in 1924 (71 per cent.); Mafia Island 1,460 to 1,690 tons (16 per cent.); Dar es Salaam from 1,277 to 1,340 tons (5 per cent.); Bagamoyo shows a decrease, from 1,161 to 1,058 tons (9 per cent.).

## Simsim (Sesame).

63. Lindi district leads the production with 1,761 tons, an increase of 34 tons only over that of 1923. Other districts of importance are Mwanza, Kilwa and Morogoro, of which in 1923 and 1924 Mwanza (with Musoma) exported 1,027 and 720 tons, and Kilwa 634 and 446 tons.

## Grains.

64. This class of exports includes millets, maize, rice and pulses. The export of these does not depend so much upon local surpluses as upon seasonal conditions in other parts of the East. The chief exporting district (mainly of sorghum millet) is Lindi, which contributed 51 per cent. of the total exports for 1924 (14,483 tons). All districts except those too remote from the railways or coast contribute from their food surpluses towards export, the more important (other than Lindi) being Morogoro, Kilwa, Rufiji and Mwanza.

## Beeswax.

65. The production for export is confined almost entirely to the Central Railway districts of Morogoro, Dodoma and Tabora, which produced 7,775 cwts. of a total of 8,497 cwts. exported in 1924, as against 5,198 of a total of 6,039 cwts. in 1923, an increase of 50 per cent. and more than covering the increase in total exports. Lesser exporting districts are Mwanza, Lindi and Kilwa. Mwanza showed an increased export; Lindi and Kilwa a reduction.

### Chillies.

66. Of a total export of 18,198 cwts., Bukoba district exported 17,096 cwts., or 94 per cent., and increased its production by 72 per cent. over that of 1923, which was 9,913 cwts.

### Gums.

67. A decrease in export is to be recorded, of gum arabic from 11,378 cwts. in 1923 to 5,238 in 1924 (54 per cent.); of gum copal from 3,362 cwts. in 1923 to 3,133 in 1924 (7 per cent.). The former is produced almost entirely in the Tabora and Mwanza districts; the latter chiefly in the Bagamoyo district.

### Rubber.

68. The export remained low, but the figure of 1923 for plantation rubber (Ceara), 1,000 cwts., was maintained; that for wild rubber decreased from 936 to 583 cwts.

### Raw Sugar.

69. The export decreased to 35 tons in 1924, from 56 tons in 1923. Pangani district exported 30 tons in 1924 (or 85 per cent. of the whole). Minor districts of production are Morogoro, Dar es Salaam, Lindi, Rufiji, Mwanza, Moshi.

## CONTROL OF PLANT PESTS AND DISEASES.

70. *Pink Bollworm of Cotton.*—The further incidence of the pink bollworm of cotton (*Platyedra gossypiella*, Saund.) was ascertained during the year and the areas of importance where it is likely to do harm are now definitely known. Cotton growing other than the indigenous native industry was introduced in 1898 (*Beit. zur Kult. von Ostafrika*, Stuhlmann, p. 515), and under the German Government no prohibition of the importation of cotton seed existed so that seed from Egypt, a country infested seriously with the pest by way of India where it is indigenous, was abundantly imported from 1903 onwards by the Kolonialwirtschaftlich Komitee, planters and by Government itself (*Ib.*, p. 517). It is authoritatively stated (Morstatt, *Beih. zum Pflanzer*, No. 1, 1914, pp. 23,26) that the pink bollworm of cotton had been known in the Territory since the beginning of (organized) cotton cultivation here, and that it continued to be the most dangerous pest, distributed generally in the country and yearly destroying a proportion of the developing bolls; further, that although its wild food plants were not known, its general distribution in the Dependency and its appearance in new cotton fields permitted it to be concluded that it was indigenous, whilst the possibility of its introduction in imported seed was by no means wholly excluded. The observations of this Department, the apparent freedom from the pest of neighbouring countries such as Uganda and Nyasaland, its confinement to districts along lines of communication (sea-coast and railways) which would therefore be infested in the movements of seed and seed-cotton, and its seeming absence from Mwanza and Shinyanga where the Germans introduced none but Uganda seed, make it very doubtful that the pest is indigenous, but lead to the reasonably certain conclusion that it was introduced from its home, India, through Egypt. In order to maintain clean the important free area of Mwanza and Shinyanga, the Department has introduced no cotton seed into that area except from Uganda, has quarantined and cleaned up the communicating areas of Kahama and Nzega, south of Shinyanga, and further is keeping the districts of Dodoma and Kondoa Irangi quarantined as a perpetual bar between the infested districts of the Central Railway and the clean areas of Mwanza and Northern Tabora (see para. 72).

71. *Uprooting and Burning of Cotton.*—The numbers of the above pest increased noticeably in 1924 and every effort was made by the Department's staff for the strict observance of the uprooting and burning measures. This involved a large number of exemplary prosecutions, of both native and non-native planters. The resistance of the latter in the earlier years, when the

land was held in the main under permits to occupy annually, has largely disappeared with the permanency of holdings (and thus of the agriculture) that has now been initiated. In the case of the native, however, realisation of the beneficial purpose of the measures comes more slowly and, with the large increase in the number of planters, defaults are numerous. The situation in 1924 rendered it necessary to call upon the assistance of the officers administering the districts to use their authority and influence to secure as rapid a cleaning of the district as possible. Control in this manner should not be difficult under a well-organized system of native administration. The

Administrative Department alone has the authority amongst the natives to make it effective. This, as well as the danger of its neglect, possibly involving the quarantining of the district and the prohibition of cotton growing for a period, is now realised and it is felt that the imperfect control of 1924 is at an end.

72. *Cotton Quarantine.*—Reference has been made to the clean area of Mwanza-Shinyanga, which is the only important cotton area in the Territory apparently free of pink bollworm. The barrier between this and the infested areas on and near the railway has in the past been maintained along a narrow non-cotton belt on the northern boundary of the Tabora sub-districts of Kahama and Nzega, the movement northwards of cotton or seed being prohibited. The presence of pink bollworm was detected in 1924 by the Entomologist sufficiently close to this barrier to make its effectiveness in future years a matter of doubt. On the recommendation of the Entomologist a quarantine of the Tabora district (except Shinyanga) was declared and cotton-growing prohibited for 1925. At the end of the season of 1924 special steps were taken to ensure that no cotton plants remained in this area. With a clean Tabora district in view in 1926 for resumption of cotton growing, it was necessary to move the barrier to the east of the district for the protection of itself as well as of Mwanza. This naturally fell in the adjoining districts of Dodoma and Kondoa Irangi which are not suited to cotton and these were brought into permanent quarantine. On the west, the Kigoma district (adjoining Lake Tanganyika) was put under temporary quarantine similarly to Tabora, for cleaning; later, as a result of a survey of the agricultural possibilities of the district, it was ascertained that the population in the only part suited to cotton was too sparse (owing to the presence of tsetse fly) to justify the expenditure on control of the industry which it is the policy of the Government to exercise. Consequently the prohibition of cotton growing in Kigoma has been made permanent, as in Dodoma and Kondoa Irangi. Finally, with its strictly controlled movement of seed, the Department has closed what may be termed cotton communication from the infested to the enlarged clean area and completed the protection of the latter.*

73. *Yellow Stain of Cotton.*—The experiment conducted by the Cotton Specialist at Mpanganya in 1923 and recorded in the last Annual Report was repeated by the District Agricultural Officer in 1924, with the same result, thus amply corroborating the findings in the West Indies that the fungus is conveyed to the boll during the act of piercing by sucking insects.

74. *Wilt and Root Knot.*—Attempts to grow the indigenous variety of *Hibiscus cannabinus* at the Botanic Gardens, Dar es Salaam, as part of an investigation of this plant for more organized production and use of its fibre by natives revealed the presence of wilt (*Fusarium* sp.) and root knot.

75. *General Work with Pests.*—This is described in the Entolomogical Report, in Appendix VI.

*Note.—It was stated to the East Africa Commission (pages 118-9 of their report) that the pink bollworm was introduced into the Tabora District by infected seed from Morogoro. I have ascertained that the seed sent to Tabora from Morogoro by the Agricultural Department was disinfected before it was despatched. It seems probable, in fact there is little doubt, from the report of the Entomologist which I have read, that the indigenous cotton which existed in the Tabora District was infested wi'h pink boll-worm at the time that the seed was sent by the Agricultural Department to that area.

*Governor, Tanganyika Territory.*

## METEOROLOGICAL MATTERS.

76. At the end of 1924 the number of stations provided with meteorological equipment was eighty-two. Of these twenty-five had rain-gauges only. Fifty stations furnished regular records. Appendix IV gives the monthly rainfall for these stations in 1924 and additional records for a few of the stations in widely separated parts of the Territory.

## REVENUE.

77. A statement is presented in Appendix VII.

## BIOLOGICAL AND AGRICULTURAL INSTITUTE, AMANI.

78. The Head Gardener, Mr. F. M. Rogers, has been in charge throughout the year, the work continuing to be almost entirely the care of the Institute. An abstract of his report is given in Appendix V.

A. H. Kirby.
*Director of Agriculture.*

# APPENDIX I.

## DISTRIBUTION OF PLANTING MATERIAL DURING THE YEAR ENDING 31st DECEMBER, 1924.

### Economic Plants.

| | |
|---|---|
| Cotton seed | 1,971 tons. |
| Groundnuts | 5,110 lb. |
| Maize | 2,770 lb. |
| Beans (Soy) | 400 lb. |
| Rice | 900 lb. |
| Coffee | 50 lb. |
| Wheat | 600 lb. |
| Millets | 560 lb. |
| Simsim | 200 lb. |
| Potatoes | 1,200 lb. |
| Sugar-cane | 1,000 cuttings. |
| Ginger | 7 packets of seed |
| Clove | 851 plants. |
| Spices (other) | 27 packets of seed. |
| Cinchona | 27 do. |
| Fruit trees and miscellaneous plants | 559 do.<br>503 plants. |

### Decorative Plants.

| | |
|---|---|
| Palms | 55 packets of seed. |
| Trees for shade and wind breaks, ornamental trees, shrubs and plants | 310 do.<br>516 plants<br>58 parcels of cuttings. |

# APPENDIX II.

## Tanganyika Territory.

## Department of Agriculture.

# SEEDS DISTRIBUTION.

**Seeds available at the Biological and Agricultural Institute, Amani.**

| | | |
|---|---|---|
| 1. | Kei apple | *Aberia caffra* |
| 2. | | ,, *Gardnerii* |
| 3. | Devil's Cotton | *Abroma augusta* |
| 4. | Catechu | *Acacia Catechu* |
| 5. | | ,, *Cunninghamii* |
| 6. | Wattle bark | ,, *decurrens* |
| 7. | Cassie | ,, *farnesiana* |
| 8. | Gum arabic | ,, *Senegal* |
| 9. | Palm | *Acanthophoenix alba* |
| 10. | | *Acer oblongum* |
| 11. | | *Acokanthera spectabilis* |
| 12. | Sapodilla plum | *Achras Sapota* |
| 13. | | *Adenanthera microsperma* |
| 14. | Barricari seeds | ,, *pavonina* |
| 15. | | *Afzelia quanzensis* |
| 16. | | ,, *bijuga* |
| 17. | | *Albizzia fastigiata* |
| 18. | | ,, *glabrescens* |
| 19. | Lebbek; Siris | ,, *Lebbek* |
| 20. | | ,, *moluccana* |
| 21. | | ,, *procera* |
| 22. | | ,, *stipulata* |
| 23. | | ,, *versicolor* |
| 24. | Candle nut | *Aleurites triloba* |
| 25. | | *Allanblackia Stulhmannii* |
| 26. | | *Allamanda neriifolia* |
| 27. | | *Aloe saponaria* |
| 28. | | ,, sp. |
| 29. | | *Amomum sceptrum* |
| 30. | Cherimoyer | *Anona Cherimolia* |
| 31. | Soursop | ,, *muricata* |
| 32. | Bullock's heart | ,, *reticulata* |
| 33. | | *Angelonia grandiflora* |
| 34. | | *Antiaris usambarensis* |
| 35. | | *Antidesma Ghesaembilla* |
| 36. | | *Antirrhinum majus:* vars. |
| 37. | | *Araucaria Bidwillii* |
| 38. | | ,, *brasiliana* |
| 39. | Areca nut palm | *Areca Catechu* |
| 40. | Palm | ,, *triandra* |
| 41. | Palm | *Arenga saccharifera* |
| 42. | | *Argemone mexicana* |
| 43. | | *Aristolochia elegans* |
| 44. | Bread fruit | *Artocarpus incisa* |
| 45. | Jak fruit | ,, *integrifolia* |
| 46. | | *Asparagus officinalis* |
| 47. | | ,, *plumosus* |
| 48. | | ,, *Sprengeri* |
| 49. | Palm | *Attalea macrocarpa* |
| 50. | Carambola | *Averrhoa Carambola* |
| 51. | | *Baphia Kirkii* |
| 52. | | *Barringtonia racemosa* |
| 53. | | *Bauhinia acuminata* |
| 54. | | *Berlinia Scheffleri* |
| 55. | Trincomalee wood | *Berria Ammonilla* |
| 56. | | *Bersama usambarica* |
| 57. | Annatto | *Bixa Orellana* |
| 58. | China grass | *Boehmeria nivea* |
| 59. | | *Bombax macrocarpum* |
| 60. | | *Bridelia micrantha* |
| 61. | China grass | *Brochoneura usambarensis* |
| 62. | | *Brunfelsia americana* |
| 63. | Divi-divi | *Caesalpinia coriaria* |
| 64. | | ,, *echinata* |
| 65. | Barbados pride | *Caesalpinia pulcherrima* |
| 66. | | *Calathea zebrina* |
| 67. | | *Calliopsis atrosanguinea* |
| 68. | | *Callitris robusta* |
| 69. | Mtondoo | *Calophyllum Inophyllum* |
| 70. | China tea | *Camellia theifera* |
| 71. | Ylang-Ylang | *Cananga odorata* |
| 72. | | *Canarium commune* |
| 73. | | ,, *polyphyllum* |
| 74. | Cannas | *Canna indica* |
| 75. | Pawpaw | *Carica Papaya* |
| 76. | Panama hat plant | *Carludovica incisa* |
| 77. | ,, ,, ,, | ,, *palmata* |
| 78. | Palm | *Carvalhoa petiolata* |
| 79. | | *Caryota mitis* |
| 80. | Kitul palm | ,, *urens* |
| 81. | Mexican apple | *Casimiroa edulis* |
| 82. | | *Cassia bacillaris* |
| 83. | | ,, *laevigata* |
| 84. | | ,, *siamea* |
| 85. | | ,, *timorensis* |
| 86. | Panama rubber | *Castilloa elastica* |
| 87. | | *Casuarina distyla* |
| 88. | Whistling Willie | ,, *equisetifolia* |
| 89. | | ,, *suberosa* |
| 90. | Forest oak | ,, *torulosa* |
| 91. | Arabian tea | *Catha edulis* |
| 92. | West Indian cedar | *Cedrela odorata* |
| 93. | | ,, sp. |
| 94. | | ,, *Toona* |
| 95. | | *Celosia argentea* |
| 96. | Cock's comb | ,, *cristata*, var. *pyramidalis* |
| 97. | Cornflower | *Centaurea Cyanus* |
| 98. | | *Chrysanthemum segetum* var. Evening Star |
| 99. | | ,, ,, *gloria-alba* |
| 100. | Coco plum | *Chrysobalanus Icaco* |
| 101. | Star apple | *Chrysophyllum Cainito* |
| 102. | | *Cinchona Ledgeriana* x *C. succirubra* |
| 103. | | *Cinchona Ledgeriana* |
| 104. | | ,, *robusta* |
| 105. | Red bark | ,, *succirubra* |
| 106. | Camphor | *Cinnamomum Camphora* |
| 107. | Cinnamon | ,, *zeylanicum* |
| 108. | Sweet orange | *Citrus Aurantium* |
| 109. | Seville orange | ,, ,, var. *Bigaradia* |
| 110. | Grape fruit | ,, *decumana* |
| 111. | Citron | ,, *medica* |
| 112. | Sweet lime | ,, ,, var. *Limetta* |
| 113. | Lemon | ,, ,, ,, *Limonum* |
| 114. | | ,, *nobilis* |
| 115. | Mandarin orange | ,, ,, var. *major* |
| 116. | Wampee | *Clausena Wampi* |

**Seeds available at the Biological and Agricultural Institute, Amani** (*Contd*).

| | | |
|---|---|---|
| 117. | Wampee | *Clerodendron sinuatum* |
| 118. | Palm | *Cocos australis* |
| 119. | ,, | ,, *eriospatha* |
| 120. | ,, | ,, *plumosa* |
| 121. | Arabian coffée | *Coffea arabica* |
| 122. | Bukoba coffee | ,, *bukobensis* |
| 123. | | ,, *excelsa* |
| 124. | Liberian coffee | ,, *liberica* |
| 125. | | ,, *micrantha* |
| 126. | | ,, *Quilloa* |
| 127. | | ,, *robusta* |
| 128. | | ,, *stenophylla* |
| 129. | Kola nut | *Cola acuminata* |
| 130. | | ,, *nitida* |
| 131. | | ,, *usambarensis* |
| 132. | | ,, *vera* |
| 133. | | *Cordia Gerascanthus* |
| 134. | | *Cosmos bipinnatus* |
| 135. | Croton oil | *Croton Tiglium* |
| 136. | | ,, *megalocarpus* |
| 137. | | *Cryptomeria japonica*, var. *araucarioides* |
| 138. | | ,, *glabra* |
| 139. | Cypress | *Cupressus Benthami* |
| 140. | | ,, *funebris* |
| 141. | | ,, ,, var. *glauca* |
| 142. | | ,, *lusitanica* |
| 143. | | ,, *macrocarpa* |
| 144. | | ,, *sempervirens* |
| 145. | Turmeric | *Curcuma longa* |
| 146. | Tree tomato | *Cyphomandra betacea* |
| 147. | Dahlias (Cactus mixed) | |
| 148. | ,, (Single ,, ) | |
| 149. | | *Datura arborea* |
| 150. | | *Deeringia celosioides* |
| 151. | | *Derris dalbergioides* |
| 152. | Yam | *Dioscorea alata* |
| 153. | | ,, *abyssinica* |
| 154. | | ,, *bulbifera* |
| 155. | | *Dipterocarpus trinervis* |
| 156. | | *Dolichandrone Hildebrantii* |
| 157. | Pigeon berry | *Duranta Plumieri* |
| 158. | Durian | *Durio Zibethinus* |
| 159. | Oil palm | *Elaeis guineensis* |
| 160. | Cardamom | *Elettaria Cardamomum* |
| 161. | Cycad | *Encephalartos Hildebrandtii* |
| 162. | Rain Tree | *Enterolobium Saman* |
| 163. | Loquat | *Eriobotrya japonica* |
| 164. | Kapok | *Eriodendron anfractuosum* |
| 165. | | *Eriodendron* sp. |
| 166. | Immortel | *Erythrina tomentosa* |
| 167. | Anauca, bocare | ,, *velutina* |
| 168. | Sassy bark | *Erythrophleum guineense* |
| 169. | Coca | *Erythroxylon Coca* |
| 170. | | ,, *Coca*, var. *novagranatense* |
| 171. | | *Eucalyptus angulosa* |
| 172. | | ,, *amygdalina* |
| 173. | | ,, *citriodora* |
| 174. | | ,, *corymbosa* |
| 175 | | ,, *corynocalyx* |
| 176. | | ,, *eximia* |
| 177. | Blue gum | ,, *Globulus* |
| 178. | | ,, *maculata* |
| 179. | | ,, *paniculata* |
| 180. | | ,, *resinifera* |
| 181. | | ,, *robusta* |
| 182. | | ,, *rostrata* |
| 183. | | ,, *salubris* |
| 184. | | ,, *Stuartiana* |
| 185. | Clove | *Eugenia caryophyllata* |
| 186 | | ,, *domestica* |
| 187 | Roseapple | ,, *Jambos* |
| 188. | | ,, *javanica* |
| 189. | Malay apple | ,, *malaccensis* |
| 190. | Malay apple | *Eugenia owariensis* |
| 191. | Pitanga cherry | ,, *uniflora* |
| 192. | Bark-cloth tree of Uganda | *Ficus chlamydodora* |
| 193. | Indian fig | *Ficus indica* |
| 194. | | ,, *nitida* |
| 195. | | ,, *Ribes* |
| 196. | | ,, *Vallis-choudae* |
| 197. | | ,, *Volkensii* |
| 198. | | *Flacourtia cataphracta* |
| 199. | Governor plum | ,, *Ramontchi* |
| 200. | | ,, *Rukam* |
| 201. | Lagos silk rubber | *Funtumia elastica* |
| 202. | | *Garcinia ferrea* |
| 203. | | ,, *Xanthochymus* |
| 204. | | *Gliricidia maculata* |
| 205. | | *Gloriosa simplex* |
| 206. | | *Grevillea Banksii* |
| 207. | | ,, *Hilliana* |
| 208. | Silky oak | ,, *robusta* |
| 209. | | *Grewia calymmatosepala* |
| 210. | Logwood | *Haematoxylon campechianum* |
| 211. | | *Harongana madagascariensis* |
| 212. | Cherry pie | *Heliotropium peruvianum* |
| 213. | Lemon lily | *Hemerocallis aurantiaca* |
| 214. | Para rubber | *Hevea brasiliensis* |
| 215. | Roselle: sorrel | *Hibiscus Sabdariffa* |
| 216. | | ,, *syriacus* |
| 217. | | *Hippeastrum equestre* |
| 218. | | *Hovenia dulcis* |
| 219. | Sandbox tree | *Hura crepitans* |
| 220. | Paraguay tea | *Ilex paraguensis* |
| 221. | | *Ipomoea Bona-nox* |
| 222. | | ,, *hederacea* |
| 223. | | ,, *centrocaulis* |
| 224. | | ,, *versicolor* |
| 225. | | *Iresine Herbstii* |
| 226. | | *Jacaranda ovalifolia* |
| 227. | Columba root | *Jateorhiza Columba* |
| 228. | Physic nut | *Jatropha Curcas* |
| 229. | Bermuda cedar | *Juniperus bermudiana* |
| 230. | Usambara cedar | ,, *procera* |
| 231. | | *Kalanchoe glandulosa* |
| 232. | | ,, *laterita* |
| 233. | African mahogany | *Khaya senegalensis* |
| 234. | Queen's flower | *Lagerstroemia Flos-reginae* |
| 235. | Rubber vine | *Landolphia Kirkii* |
| 236. | | ,, *Stolzii* |
| 237. | | ,, sp. |
| 238. | | *Leea sundaica* |
| 239. | | *Leucaena glauca* |
| 240. | | *Lilium regale* |
| 241. | Palm | *Livistona australis* |
| 242. | Palm | ,, *chinensis* |
| 243. | | ,, *olivaeformis* |
| 244. | | *Lucuma Rivicoa* var. *angustifolia* |
| 245. | Lupins | *Lupinus luteus*, vars |
| 246. | Mango | *Mangifera indica* |
| 247. | | *Manihot dichotoma* |
| 248. | Ceara rubber | ,, *Glaziovii* |
| 249. | Arrowroot | *Maranta arundinacea* |
| 250. | Palm | *Martinezia caryotaefolia* |
| 251. | | *Mascarenhasia elastica* |
| 252. | | *Melaleuca hypericifolia* |
| 253. | Cajeputi | ,, *Leucadendron* |
| 254. | Champak | *Michelia Champaca* |
| 255. | Sensitive plant | *Mimosa pudica* |
| 256. | Calabash nutmeg | *Monodora myristica* |
| 257. | Horse radish tree | *Moringa pterygosperma* |
| 258. | | *Musa coccinea* |
| 259. | Manila hemp | ,, *textilis* |
| 260. | | *Myrica mexicana* |
| 261. | Balsam of Peru | *Myroxylon Pereirae* |
| 262. | Rhambutan | *Nephelium Lappaceum* |
| 263. | | *Nicotiana affinis* |

**Seeds available at the Biological and Agricultural Institute, Amani** (*Contd*).

| | | |
|---|---|---|
| 264. | Palm | *Oreodoxa oleracea* |
| 265. | | *Pandanus labyrinthicus* |
| 266. | | ,, *Stuhlmannii* |
| 267. | | ,, *utilis* |
| 268. | | *Parinarium Goetzenianum* |
| 269. | | ,, *Holstii* |
| 270. | Candle tree | *Parmentiera cerifera* |
| 271. | Granadilla | *Passiflora edulis* |
| 272. | | *Passiflora quadrangularis* |
| 273. | | *Pavetta* sp. |
| 274. | | *Payena Leerii* |
| 275. | | *Peltophorum dasyrachis* |
| 276. | | *Pentadesma butyracea* |
| 277. | | *Pentas coccinea* |
| 278. | | ,, *purpurea* |
| 279. | Avocado pear | *Persea gratissima* |
| 280. | | *Phlox Drummondii* |
| 281. | Palm | *Phoenix canariensis* |
| 282. | ,, | ,, *humilis* |
| 283. | ,, | ,, *sylvestris* |
| 284. | New Zealand hemp | *Phormium tenax* |
| 285. | Otaheite gooseberry | *Phyllanthus distichus* |
| 286. | Cape gooseberry | *Physalis peruviana* |
| 287. | | *Pilocarpus pennatifolius* |
| 288. | Jaborandi | ,, *racemosus* |
| 289. | | *Pimenta acris* |
| 290. | Long pepper | *Piper Chaba* |
| 291. | Black pepper | ,, *nigrum* |
| 292. | Turpentine tree | *Pistacia Terebinthus* |
| 293. | | *Pithecolobium dulce* |
| 294. | | ,, *Unguis-cati* |
| 295. | | *Pittosporum undulatum* |
| 296. | | *Pleomele elliptica* |
| 297. | | *Plumieria acutifolia* |
| 298. | Frangipani | ,, *alba* |
| 299. | | *Podocarpus usambarensis* |
| 300. | Brazilian guava | *Psidium Cattleianum* |
| 301. | Guava | ,, *Guava* |
| 302. | Red guava | *Psidium Guava*, var. *pomiferum* |
| 303. | White guava | ,, var. *pyriferum* |
| 304. | | ,, *pumilum* |
| 305. | Chinese guava | ,, *sinensis* |
| 306. | Palm | *Ptychococcus paradoxus* |
| 307. | | *Pterocarpus abyssinicus* |
| 308. | | *Randia Buchananii* |
| 309. | | ,, *sericantha* |
| 310. | Raffia palm | *Raphia pedunculata* |
| 311. | | *Raphia* sp. |
| 312. | Travellers' tree | *Ravenala madagascariensis* |
| 313. | Japan wax | *Rhus succedanea* |
| 314. | Arum lily | *Richardia africana* |
| 315. | | *Russelia juncea* |
| 316. | Palm | *Sabal Palmetto* |
| 317. | | *Salvia splendens* |
| 318. | | *Sanchezia nobilis* |
| 319. | Soap berry | *Sapindus Saponaria* |
| 320. | | *Sapium sebiferum* |
| 321. | | *Schefflerodendron usambarense* |
| 322. | | *Schizolobium excelsum* |
| 323. | Chayote: choco | *Sechium edule* |
| 324. | | *Solanum atropurpureum* |
| 325. | | ,, *seaforthianum* |
| 326. | Tree solanum | ,, *Wrightii* |
| 327. | | *Spondias dulcis* |
| 328. | Hog plum | ,, *lutea* |
| 329. | | *Statice sinuata* |
| 330. | | *Sterculia appendiculata* |
| 331. | Stave wood | ,, *foetida* |
| 332. | | ,, *Scheffleri* |
| 333. | | *Strobilanthes dyerianus* |
| 334. | | *Strypnodendron Barbatimam* |
| 335. | | *Syncarpia laurifolia* |
| 336. | | *Tabernaemontana Holstii* |
| 337. | African marigold | *Tagetes erecta* |
| 338. | | *Tecoma stans* |
| 339. | Teak | *Tectona grandis* |
| 340. | Mkweme | *Telfairia pedata* |
| 341. | | *Tephrosia Vogelii* |
| 342. | Indian Almond | *Terminalia Catappa* |
| 343. | | *Terminalia Chebula* |
| 344. | | *Tetrapleura Thonningii* |
| 345. | Cocoa | *Theobroma Cacao* |
| 346. | | *Thespesia macrophylla* |
| 347. | | *Thevetia neriifolia* |
| 348. | Okwa | *Treculia africana* |
| 349. | | *Trichilia emetica* |
| 350. | | ,, *subcordata* |
| 351. | Voa Vanga | *Vangueria edulis* |
| 352. | | ,, *infausta* |
| 353. | | *Vinca alba* |
| 354. | | ,, *rosea* |
| 355. | | *Widdringtonia Whytei* |
| 356. | | *Zephyranthes carinata* |
| 357. | Ginger | *Zingiber officinalis.* |

F. M. ROGERS,
*Head Gardener.*

**Seeds available at the Agricultural Station, Morogoro.**

| | | |
|---|---|---|
| 1. | Red sandalwood | *Adenanthera pavonina* |
| 2. | Soursop | *Anona muricata* |
| 3. | Pawpaw | *Carica Papaya* |
| 4. | Whistling Willie | *Casuarina equisetifolia* |
| 5. | West Indian cedar | *Cedrela odorata* |
| 6. | Sweet orange | *Citrus Aurantium* |
| 7. | Shaddock | ,, *decumana* |
| 8. | Lime | ,, *medica* var. *Limetta* |
| 9. | Tangerine | ,, *nobilis* var. |
| 10. | Oil palm | *Elaeis guineensis* |
| 11. | Kapok | *Eriodendron anfractuosum* |
| 12. | Physic nut | *Jatropha Curcas* |
| 13. | Mango | *Mangifera indica* |
| 14. | Avocado pear | *Persea gratissima* |
| 15. | Brazilian guava | *Psidium Cattleianum* |
| 16. | West Indian guava | ,, *Guava* |
| 17. | | ,, *pumilum* |
| 18. | Chinese guava | ,, *sinensis* |
| 19. | Pomegranate | *Punica Granatum* |
| 20. | Hog plum | *Spondias lutea* |
| 21. | Teak | *Tectona grandis* |

E. BRAND,
*District Agricultural Officer.*

**Seeds available at the Botanic Gardens, Dar es Salaam.**

| | | | | | |
|---|---|---|---|---|---|
| 1. | Cassie | *Acacia farnesiana* | 29. | Sycamore fig | *Ficus Sycomorus* |
| 2. | Baobab | *Adansonia digitata* | 30. | | ,, *Volkensii* |
| 3. | Barricari seeds | *Adenanthera pavonina* | 31. | | *Garcinia Xanthochymus* |
| 4. | | *Afzelia quanzensis* | 32. | Logwood | *Haematoxylon campechianum* |
| 5. | Lebbek: siris | *Albizzia Lebbek* | 33. | | *Hyophorbe Verschaffeltii* |
| 6. | Cashew nut | *Anacardium occidentale* | 34. | | *Hyphaene macrocarpa* |
| 7. | Soursop | *Anona muricata* | 35. | Coral flower | *Jatropha multifida* |
| 8. | Custard apple | ,, *reticulata* | 36. | Cucumber tree | *Kigelia aethiopica* |
| 9. | Sweet sop | ,, *squamosa* | 37. | Henna | *Lawsonia inermis* |
| 10. | Corallita | *Antigonon Leptopus* | 38. | Pride of India | *Melia Azedarach* |
| 11. | | *Baphia Kirkii* | 39. | Horseradish tree | *Moringa pterygosperma* |
| 12. | | *Bauhinia acuminata* | 40. | | *Pandanus livingstonianus* |
| 13. | Divi-divi | *Caesalpinia coriaria* | 41. | | *Peltophorum ferrugineum* |
| 14. | Barbados pride | ,, *pulcherrima* | 42. | | *Pithecolobium Unguis-cati* |
| 15. | Mtondoo | *Calophyllum Inophyllum* | 43. | Flamboyante | *Poinciana regia* |
| 16. | | *Caryota mitis* | 44. | Traveller's tree | *Ravenala madagascariensis* |
| 17. | | *Cassia siamea* | 45. | Soap berry | *Sapindus Saponaria* |
| 18. | Whistling Willie | *Casuarina equisetifolia* | 46. | | *Schizolobium excelsum* |
| 19. | | *Clitoria ternatea* | 47. | | *Solanum seaforthianum* |
| 20. | Seaside grape | *Coccoloba uvifera* | 48. | | *Sorindeia obtusifoliata* |
| 21. | Calabash tree | *Crescentia Cujete* | 49. | | *Sterculia alata* |
| 22. | | *Cryptostegia grandiflora* | 50. | Stave wood | ,, *foetida* |
| 23. | Rosewood of S. India | *Dalbergia latifolia* | 51. | | *Strychnos Volkensii* |
| 24. | Oil palm | *Elaeis guineensis* | 52. | Tamarind | *Tamarindus indica* |
| 25. | | *Encephalartos Hildebrandtii* | 53. | Teak | *Tectona grandis* |
| 26. | Rain tree | *Enterolobium Saman* | 54. | Indian almond | *Terminalia Catappa* |
| 27. | Java plum | *Eugenia Jambolana* | 55. | | *Terminalia Arjuna* |
| 28. | | *Ficus Bussei* | 56. | Lucky bean | *Thevetia neriifolia* |

T. H. MARSHALL,
*Head Gardener.*

The above seeds may be obtained from the stations mentioned in packets at Shs. 0/50 or Shs. 1/00. All requests for seeds should be accompanied by a remittance in full payment for them.

A. H. KIRBY,
*Director of Agriculture.*

# APPENDIX III.

## A. GINNERIES IN OPERATION DURING THE SEASON 1924-5.

| No. | District. | Locality. | Number of gins. | | Licensee. |
|---|---|---|---|---|---|
| | | | Saw. | Roller. | |
| 1 | Dar es Salaam ... | Pugu ... ... | 2 | 12 | Abdulrasul and Sons. |
| 2 | ,, ... | Dar es Salaam ... | 1 | 7 | Rosehaugh Company. |
| 3 | Morogoro ... ... | Kilosa ... ... | — | 12 | ,, |
| 4 | ,, ... ... | Rudewa ... ... | — | 20 | Mathradas Nanj & Co. |
| 5 | ,, ... ... | Mkata ... ... | — | 12 | Karimjee Jivanjee & Co. |
| 6 | ,, ... ... | Morogoro ... ... | 1 | 17 | Rosehaugh Company. |
| 7 | ,, ... ... | Mikese ... ... | 2 | 10 | Ramji Gulamani. |
| 8 | ,, ... ... | Ngerengere ... | 1 | 6 | Rosehaugh Company. |
| 9 | Tabora ... ... | Usagore ... ... | 4 | — | B. E. A. Corporation. |
| 10 | Mwanza ... ... | Ukerewe Island ... | 1 | 8 | White Fathers' Mission. |
| 11 | ,, ... ... | Ihale ... ... | — | 6 | G. H. Abdrasul & Co. |
| 12 | ,, ... ... | Mwanza ... ... | — | 14 | Nakasero Trading Co. |
| 13 | ,, ... ... | Nyambiti ... ... | 2 | 6 | B. C. G. Association. |
| 14 | ,, ... ... | Nyanguge ... ... | 2 | 5 | ,, |
| 15 | ,, ... ... | Pambani ... ... | — | 8 | Kampala Genl. Agency. |
| 16 | ,, ... ... | Runere ... ... | 5 | — | B. E. A. Corporation. |
| 17 | ,, ... ... | Malampaka ... | 4 | — | ,, |
| 18 | Lindi ... ... | Lindi ... ... | — | 14 | Mathuradas Nanji & Co. |
| 19 | ,, ... ... | ,, ... ... | — | 14 | Rosehaugh Compeny. |
| 20 | Kilwa ... ... | Kikanda ... ... | 1 | 7 | ,, |
| 21 | Rufiji ... ... | Kilimani ... ... | — | 14 | Frantzis and Horn. |
| 22 | ,, ... ... | Betya ... ... | — | 6 | Rosehaugh Company. |
| 23 | Bagamoyo ... ... | Bagamoyo ... ... | 1 | 5 | Holy Ghost Mission. |
| 24 | Usambara ... ... | Ndungu ... ... | — | 3 | Chabildas Mehta. |
| 25 | ,, ... ... | Kwashemshi ... | 2 | — | Kwashemshi Estate. |
| 26 | Moshi ... ... | Himo ... ... | 1 | 7 | Sharif Jiwa and Company. |
| 27 | ,, ... ... | Near Himo ... | — | — | A. Mongardi. |
| 28 | ,, ... ... | ,, ... ... | — | — | G. Deusebes. |

## B. ADDITIONAL GINNERIES EXPECTED TO BE IN OPERATION IN 1925.

| | District. | Locality. | Licensee. |
|---|---|---|---|
| 1 | Morogoro | Msowero | E. Kladites |
| 2 | do. | Mvomero | Ghose and Patel |
| 3 | do. | Mlali | Mathradas Nanji & Co. |
| 4 | Tabora | Luhombo | B.E.A. Corporation |
| 5 | Mwanza | Bukumbi | Bhangwanji Sunderji & Co. |
| 6 | do. | Nassa | G. Boschetti |
| 7 | Rufiji | Logeloge | Frantzis and Horn |
| 8 | do. | Kilindi | Rosehaugh Company |
| 9 | Pangani | Pangani | Jaffer Abdullah Khimji |
| 10 | Tanga | Mnyusi | Karimjee Jivanjee |
| 11 | | Tongoni | G. Galanos |
| 12 | Usambara | Ngombezital | T. E. Sachak |
| 13 | Arusha | Mbugwe | Themi Coffee Estate. |

# APPENDIX IV (A)

## TANGANYIKA TERRITORY—RAINFALL IN MILLIMETRES, 1924.

| Station. | Alt. Feet | Lat. S | Long. E | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arusha ... ... ... ... ... | 4,416 | 3°23′ | 36°43′ | 32.50 | 185.20 | 178.00 | 474.40 | 81.00 | 97.00 | 5.50 | 21.10 | 8.50 | Nil | 72.50 | 73.50 | 1,211.20 |
| Bagamoyo ... ... ... ... | S.L. | 6°25′ | 38°55′ | 44.00 | 132.40 | 116.50 | 211.00 | 85.00 | 37.60 | 6.50 | 10.20 | 5.10 | 11.20 | 37.00 | 149.96 | 846.46 |
| Bukoba ... ... ... ... ... | 3,709 | 1°20′ | 31°47′ | 84.20 | 197.80 | 166.60 | 532.60 | 395.70 | 5.40 | 29.60 | 133.50 | 124.40 | 43.50 | 219.10 | 97.00 | 2,029.40 |
| Biharamulo ... ... ... ... | 4,350 | 2°42′ | 31°26′ | 178.00 | 99.50 | 88.10 | 278.30 | 34.20 | 0.70 | 0.62 | 12.70 | 5.00 | 62.00 | 71.62 | 158.68 | 989.42 |
| Dar es Sa'aam ... ... ... ... | S.L. | 6°50′ | 39°17′ | 12.44 | 124.51 | 80.52 | 205.48 | 96.39 | 72.77 | 27.68 | 10.41 | 39.11 | 6.73 | 18.79 | 40.38 | 735.21 |
| Dodoma ... ... ... ... ... | 3,693 | 6°11′ | 35°46′ | Nil | 144.70 | 16.30 | 31.40 | Nil | Nil | Nil | 0.20 | Nil | Nil | 12.00 | 16.20 | 220.80 |
| Manyoni ... ... ... ... ... | 4,300 | | | 65.10 | 181.10 | 32.00 | 41.10 | 0.30 | 2.60 | Nil | Nil | Nil | Nil | 20.80 | 52.46 | 332.56 |
| Singida ... ... ... ... ... | 5,233 | 4°48′ | 34°48′ | 43.30 | 218.60 | 163.20 | 18.50 | 1.20 | 2.10 | Nil | 1.60 | Nil | Nil | 10.90 | 35.60 | 495.00 |
| Malangali ... ... ... ... | 4,775 | 8°35′ | 30°00′ | 124.40 | 208.00 | 141.20 | 36.00 | Nil | Nil | Nil | Nil | Nil | Nil | Nil | 99.00 | 608.60 |
| Madibira Mission ... ... ... | 3,598 | 8°00′ | 34°08′ | 285.00 | 7.32 | 339.00 | 122.00 | Nil | Nil | Nil | Nil | Nil | Nil | Nil | 1.30 | 754.62 |
| Kilwa ... ... ... ... ... | S.L. | 8°44′ | 39°25′ | 87.80 | 179.70 | 117.00 | 24.40 | 2.10 | 16.00 | Nil | 0.30 | 9.00 | 2.90 | 16.60 | 14.30 | 470.10 |
| Liwale ... ... ... ... ... | 1,500 | 9°45′ | 38°00′ | 144.00 | 230.00 | 90.20 | 3.50 | 3.70 | 0.90 | Nil | Nil | 15.00 | 1.80 | 13.60 | Nil | 502.70 |
| Kondoa Irangi ... ... ... ... | 4,610 | 4°57′ | 35°38′ | 55.40 | 131.30 | 11.00 | 38.20 | 1.00 | 1.00 | Nil | 1.40 | Nil | Nil | 15.70 | 26.10 | 281.10 |
| Mkalama ... ... ... ... | 4,235 | 4°06′ | 34°38′ | 67.00 | 171.00 | 83.90 | 23.60 | 0.60 | Nil | Nil | 0.10 | 3.18 | 11.02 | 121.36 | 38.27 | 520.03 |
| Lindi ... ... ... ... ... | S.L. | 10°00′ | 39°43′ | 179.10 | 53.52 | 21.50 | 108.40 | 5.60 | 23.00 | Nil | Nil | Nil | 9.90 | 11.00 | 15.80 | 427.82 |
| Tunduru ... ... ... ... | 2,300 | 11°05′ | 37°27′ | 138.30 | 89.80 | 198.00 | 20.20 | 4.00 | 7.80 | Nil | Nil | 4.10 | Nil | 1.20 | 108.50 | 571.90 |
| Masasi Mission ... ... ... | 1,505 | 10°42′ | 38°53′ | 160.50 | 58.90 | 242.40 | 32.20 | 0.70 | 4.90 | Nil | 7.10 | 26.50 | 3.50 | Nil | 9.60 | 546.30 |
| Mafia Island (Kilindoni) ... ... | 63 | 7°55′ | 39°45′ | 255.90 | 208.90 | 433.70 | 271.00 | 66.60 | 85.80 | 18.80 | 2.20 | 20.00 | 13.90 | 145.70 | 70.40 | 1,592.90 |
| Mahenge ... ... ... ... | 3,352 | 8°40′ | 36°43′ | 541.00 | 321.00 | 409.00 | 189.00 | 7.50 | 40.00 | Nil | 9.00 | 7.00 | 26.00 | 15.00 | 85.00 | 1,649.50 |
| Morogoro ... ... ... ... | 1,628 | 6°48′ | 37°46′ | 15.50 | 261.50 | 152.70 | 207.10 | 76.90 | 15.70 | 10.50 | 7.90 | 42.70 | Nil | 39.90 | 27.00 | 857.40 |
| Kilosa ... ... ... ... ... | 1,606 | 6°48′ | 37°01′ | 69.70 | 133.10 | 260.40 | 147.00 | 40.10 | 26.60 | Nil | Nil | 35.90 | 6.00 | 34.40 | 28.20 | 781.40 |
| Ngerengere ... ... ... ... | 641 | 6°47′ | 38°08′ | 29.00 | 232.00 | 63.00 | 142.00 | 88.00 | 47.00 | Nil | 5.00 | 53.40 | 12.40 | 74.70 | 52.19 | 798.69 |
| Moshi ... ... ... ... ... | 2,649 | 3°22′ | 37°22′ | Nil | 80.20 | 15.90 | 323.10 | 37.50 | 45.00 | 3.70 | 6.80 | 0.20 | Nil | 36.80 | 30.00 | 579.20 |
| Kilema Mission ... ... ... ... | 4,703 | 3°19′ | 37°29′ | 3.00 | 148.60 | 68.50 | 618.10 | 52.60 | 91.40 | 30.80 | 55.20 | 49.40 | 11.80 | 218.50 | 120.80 | 1,468.70 |
| Mwanza ... ... ... ... ... | 3,709 | 3°32′ | 32°53′ | 60.20 | 196.70 | 112.60 | 210.20 | 48.90 | Nil | Nil | 29.30 | 5.00 | 56.30 | 54.40 | 102.90 | 876.50 |
| Pangani ... ... ... ... ... | S.L. | 5°25′ | 38°58′ | 4.25 | 5.69 | 9.45 | 23.77 | 12.09 | 5.16 | 2.61 | 6.74 | 2.07 | 1.69 | 2.33 | 3.98 | 79.82 |
| Utete ... ... ... ... ... | 327 | 8°00′ | 38°45′ | 104.20 | 98.20 | 131.20 | 96.00 | 60.70 | 55.50 | 8.50 | 0.07 | 9.20 | 18.80 | 34.80 | 15.10 | 632.27 |
| Tukuyu ... ... ... ... ... | 5,069 | 9°15′ | 33°38′ | 449.80 | 425.30 | 220.90 | 837.40 | 168.90 | 96.80 | 85.40 | 141.10 | 15.80 | 1.60 | 102.10 | 105.80 | 2,650.90 |
| Itete Mission ... ... ... ... | 6,540 | 8°56′ | 33°13′ | 251.00 | 332.00 | 259.00 | 664.50 | 145.00 | 139.00 | 66.00 | 129.00 | 59.50 | Nil | 119.00 | 120.50 | 2,284.50 |
| Livingstonia Mission (Kimbila) ... | 4,400 | 9°15′ | 33°40′ | 313.43 | 442.21 | 268.20 | 943.80 | 155.90 | 135.10 | 86.61 | 2.98 | Nil | Nil | 109.00 | 0.95 | 2,458.18 |

# APPENDIX IV (A)

## TANGANYIKA TERRITORY—RAINFALL IN MILLIMETRES, 1924.—*continued.*

| STATION | Alt. Feet | Lat. S | Long. N | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Igala ... ... ... ... ... | | | | 241.90 | 177.30 | 160.10 | 37.70 | Nil | Nil | Nil | Nil | Nil | Nil | 65.40 | 68.70 | 751.10 |
| Isoko ... ... ... ... ... | | | | 12.62 | 12.23 | 13.70 | 18.82 | 4.14 | 3.81 | 2.34 | 1.51 | Nil | Nil | 3.04 | 1.77 | 73.98 |
| Songea ... ... ... ... ... | 3,826 | 10°42′ | 35°40′ | 216.51 | 184.10 | 231.50 | 7.30 | Nil | Nil | Nil | Nil | Nil | Nil | 2.30 | 26.00 | 667.70 |
| Lipumba ... ... ... ... | 3,270 | 10°48′ | 35°05′ | 230.70 | 298.40 | 187.40 | 13.50 | Nil | 4.50 | Nil | Nil | 1.30 | Nil | 46.60 | 100.70 | 883.10 |
| Milo ... ... ... ... ... | 8,300 | 10°04′ | 34°39′ | 242.90 | 290.50 | 325.20 | 240.80 | 7.00 | Nil | Nil | Nil | Nil | Nil | 20.08 | 96.20 | 1,222.68 |
| Lituhi Mission ... ... ... ... | | | | 699.00 | 1,092.00 | 889.00 | 354.00 | 7.00 | 58.00 | 2.00 | 7.00 | 17.00 | Nil | 256.00 | 33.00 | 3,414.00 |
| Tabora ... ... ... ... ... | 4,000 | 5° | 32° | 84.20 | 172.70 | 97.90 | 87.10 | 0.40 | Nil | Nil | Nil | 2.70 | 6.80 | 35.50 | 38.70 | 546.00 |
| Kahama ... ... ... ... ... | 4,055 | 3°35′ | 32°33′ | 137.70 | 181.10 | 139.30 | 87.10 | 4.00 | Nil | Nil | 3.80 | 0.40 | 47.60 | 30.40 | 107.90 | 739.30 |
| Kolandota Mission ... ... ... | 4,400 | 3°34′ | 33°19′ | 18.60 | 93.70 | 134.20 | 67.10 | 6.40 | Nil | Nil | Nil | 31.30 | 26.70 | 92.40 | 79.80 | 550.20 |
| Tanga ... ... ... ... ... | S.L. | 5°40′ | 39°07′ | 96.70 | 237.20 | 24.20 | 299.80 | 130.20 | 110.60 | 28.20 | 41.10 | 79.90 | 10.40 | 57.80 | 41.81 | 1,157.90 |
| Namanyere ... ... ... ... | 5,100 | 8° | 32° | 111.82 | 177.75 | 82.38 | 50.39 | 114.30 | Nil | Nil | 23.40 | 15.50 | 10.22 | 75.49 | 154.82 | 815.97 |
| Kasanga ... ... ... ... ... | 2,630 | 8°30′ | 31° | 43.22 | 284.05 | 60.08 | 4.00 | 4.50 | Nil | Nil | Nil | 1.06 | 6.07 | 31.06 | 136.34 | 570.38 |
| Kale Mission ... ... ... ... | | | | 3.74 | 11.43 | 3.91 | 6.03 | 1.36 | 0.25 | Nil | 0.21 | 3.32 | 0.66 | 3.16 | 7.55 | 41.62 |
| Kigoma ... ... ... ... ... | 2,531 | 4°52′ | 29°38′ | 96.66 | 74.70 | 114.00 | 208.50 | 4.10 | Nil | Nil | Nil | 15.00 | 19.10 | 130.20 | 121.10 | 786.36 |
| Ujiji ... ... ... ... ... | 2,738 | 4°59′ | 29°47′ | 160.70 | 133.50 | 127.30 | 187.70 | 13.80 | Nil | Nil | Nil | 14 05 | 66.26 | 141.07 | 134.63 | 979.01 |
| Kasulu ... ... ... ... ... | 4,530 | 4°35′ | 30°07′ | 227.30 | 218.50 | 109.80 | 257.20 | 7.50 | Nil | Nil | Nil | Nil | 75.50 | 85.30 | 125.00 | 1,106.10 |
| Lushoto ... ... ... ... ... | 4,579 | 4°47′ | 38°17′ | 39.20 | 287.30 | 50.40 | 364.40 | 93.40 | 111.50 | 27.00 | 31.40 | 6.00 | Nil | 37.10 | 48.90 | 1,099.60 |
| Sakare ... ... ... ... ... | 4,500 | 5° | 38°25′ | 27.50 | 190.10 | 81.70 | 553.80 | 273.40 | 179.00 | 84.90 | 58.10 | 38.00 | 4.30 | 38.30 | 57.60 | 1,586.70 |
| Suji ... ... ... ... ... | | | | 112.40 | 182.10 | 83.50 | 41.10 | 2.40 | 30.60 | Nil | 1.50 | Nil | Nil | 102.80 | 139.70 | 696.10 |
| Amani ... ... ... ... ... | 3,004 | 5°06′ | 38°38′ | 55.90 | 221.40 | 145.50 | 361.30 | 243.00 | 136.70 | 90.70 | 83.30 | 69.60 | 28.40 | 48.00 | 76.40 | 1,560.20 |

# METEOROLOGICAL RECORDS. SELECTED STATIONS.

## STATION: DAR ES SALAAM, 1924.

Longitude, 39.°40′E. Latitude, 6.°80.′S Altitude, 20 feet.

| Months | Mean Pressure | Air Temperature (Degrees Centigrade) (Time of Observations: 9 a.m.) | | | | | | | | | | Tension of Vapour | | | | Relative Humidity | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 1 | 9 | Mean | Mean of Min. | Mean of Max. | Absolute Min. | Date | Absolute Max. | Date | 7 | 1 | 9 | Mean | 9 a.m. | 4 p.m. | | Mean |
| January ... ... ... | | | | | 28·52 | 24·90 | 32·00 | 22·50 | 21, 26. | 33·50 | 31. | | | | | 70·80 | 50·90 | | 60·80 |
| February ... ... ... | | | | | 28·23 | 24·20 | 32·30 | 21·00 | 14. | 34·00 | 1, 2, 12. | | | | | 78·00 | 82·30 | | 80·10 |
| March... ... ... ... | | | | | 28·01 | 23·85 | 32·17 | 22·00 | 28. | 33·50 | 23, 24, 31. | | | | | 78·40 | 69.80 | | 74·10 |
| April ... ... ... ... | | | | | 26·85 | 23·10 | 30·50 | 21·00 | 24,25. | 33·50 | 2,3. | | | | | 79·40 | 73·20 | | 76·30 |
| May ... ... ... ... | | | | | 26·17 | 22·20 | 30·10 | 19·50 | 25. | 32·00 | 12. | | | | | 75.40 | 63·30 | | 69·30 |
| June ... ... ... ... | | | | | 24·56 | 20·00 | 28·80 | 19·00 | 4, 6, 23, 27. | 31·00 | 7. | | | | | 86·50 | 83·00 | | 84·70 |
| July ... ... ... ... | | | | | 23·90 | 19·60 | 28·70 | 16.50 | 10. | 31·50 | 29. | | | | | 83·00 | 64·20 | | 73.60 |
| August ... ... ... .. | | | | | 24·14 | 18·80 | 29·35 | 16·50 | 11. | 31·00 | 27. | | | | | 74·20 | 57·20 | | 65·70 |
| September ... ... ... | | | | | 24·19 | 19·70 | 28·60 | 17·50 | 5. | 31·00 | 6,24. | | | | | 67·60 | 64·20 | | 65·90 |
| October ... ... ... | | | | | 25·42 | 21·20 | 29.60 | 18·50 | 1. | 31·00 | 21. | | | | | 70·20 | 70·80 | | 70·50 |
| November ... ... ... | | | | | 26·80 | 22·75 | 30.85 | 20·50 | 1, 2. | 32·00 | 30. | | | | | 70·60 | 72·40 | | 71·70 |
| December ... ... ... | | | | | 28·15 | 24·60 | 31.70 | 22·00 | 1, 3, 4. | 33·50 | 11. | | | | | 76·00 | 70·00 | | 73·00 |

| Months | Amount of Cloud | | | Rainfall in millimetres on any one day (Time Observations: 9 a.m.) | | | | Weather Number of days of | | | | | | | Wind Number of Observations of | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 7 | 1 | 9 | Mean | Total for month | Max. | Date | Rain | Snow | Hail | Thunder Storms | Clear sky | Over-cast | Gales | N. | N.E. | E. | S.E. | S. | S.W. | W. | N.W. | Calm. |
| January ... ... ... | | | | 0·62 | 19·10 | 12·57 | 20 | 5 | | | | | | | | | | | | | | | |
| February ... ... ... | | | | 5·27 | 152·75 | 3·12 | 14 | 11 | | | | | | | | | | | | | | | |
| March ... ... ... ... | | | | 4·13 | 128·00 | 41·25 | 25 | 11 | | | | | | | | | | | | | | | |
| April ... ... ... ... | | | | 5·95 | 178·37 | 36·25 | 25 | 15 | | | | | | | | | | | | | | | |
| May ... ... ... ... | | | | 2·64 | 81·75 | 24·50 | 29 | 8 | | | | | | | | | | | | | | | |
| June ... ... ... ... | | | | 1·92 | 57·50 | 18·00 | 8 | 10 | | | | | | | | | | | | | | | |
| July ... ... ... ... | | | | 0·83 | 26·00 | 9·00 | 17 | 5 | | | | | | | | | | | | | | | |
| August ... ... ... .. | | | | 0·45 | 13·87 | 7·50 | 9 | 3 | | | | | | | | | | | | | | | |
| September ... ... | | | | 1·16 | 34·37 | 11·75 | 8 | 5 | | | | | | | | | | | | | | | |
| October ... ... ... | | | | 0·20 | 6·25 | 3·25 | 8 | 3 | | | | | | | | | | | | | | | |
| November ... ... ... | | | | 0·71 | 21·25 | 10·25 | 22 | 5 | | | | | | | | | | | | | | | |
| December ... ... ... | | | | 1·36 | 42·00 | 23·00 | 17 | 6 | | | | | | | | | | | | | | | |

## Station: ARUSHA, 1924.

Longitude, 36°.43′ E. Latitude, 3°.23′ S. Altitude 4,416 feet.

| Months | Mean Pressure | Air Temperature (Degrees Centigrade) (Time of Observations: 9 a.m.) | | | | | | | | | | Tension of Vapour | | | | Relative Humidity | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 1 | 9 | Mean | Mean of Min. | Mean of Max. | Absolute Min. | Absolute Min. Date | Absolute Max. | Absolute Max. Date | 7 | 1 | 9 | Mean | 9 a.m. | 4 p.m. | | Mean |
| January ... ... ... | | | | | 22.57 | 13.73 | 31.42 | 10.00 | 10, 11, 12, 14. | 34.00 | 15. | | | | | | | | |
| February ... ... ... | | | | | 22.05 | 15.48 | 28.62 | 13.00 | 8. | 33.00 | 9. | | | | | | | | |
| March ... ... ... | | | | | 22.95 | 16.39 | 29.52 | 14.00 | 2, 8, 13. | 31.00 | 3, 14, 17, 21, 22, 23. | | | | | | | | |
| April ... ... ... ... | | | | | 20.34 | 15.45 | 25.23 | 11.00 | 18. | 29.00 | 5, 8. | | | | | | | | |
| May ... ... ... ... | | | | | 20.13 | 14.66 | 25.61 | 13.00 | 24, 26, 27. | 29.00 | 29. | | | | | | | | |
| June ... ... ... ... | | | | | 18.68 | 13.13 | 24.23 | 10.00 | 8. | 26.00 | 1, 2, | | | | | | | | |
| July ... ... ... ... | | | | | 17.33 | 12.19 | 22.48 | 11.00 | 9. | 25.00 | 29. | | | | | | | | |
| August ... ... ... ... | | | | | 18.08 | 12.55 | 23.61 | 11.00 | 11. | 27.00 | 20. | | | | | | | | |
| September ... ... ... | | | | | 19.33 | 12.93 | 25.73 | 11.00 | 18. | 29.00 | 30. | | | | | | | | |
| October ... ... ... | | | | | 22.35 | 15.00 | 29.71 | 12.00 | 8. | 31.00 | 15, 23. | | | | | | | | |
| November ... ... ... | | | | | 21.31 | 14.93 | 27.70 | 12.00 | 2, 26. | 32.00 | 8. | | | | | | | | |
| December ... ... ... | | | | | 21.43 | 14.29 | 28.57 | 11.00 | 5, 6, 8. | 32.00 | 7. | | | | | | | | |

| Months | Amount of Cloud | | | Rainfall in millimetres on any one day (Time of Observations 9 a.m.) | | | | Weather Number of Days of | | | | | | | Wind Number of Observations of | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 7 | 1 | 9 | Mean | Total for month | Max. | Date | Rain. | Snow. | Hail. | Thunder Storms | Clear Sky. | Over-cast | Gales | N. | N.E. | E. | S.E. | S. | S.W. | W. | N.W. | Calm. |
| January ... ... ... | | | | 1.05 | 32.50 | 23.00 | 25 | 5 | | | | | | | | | | | | | | | |
| February ... ... ... | | | | 6.39 | 185.20 | 50.00 | 19 | 17 | | | | | | | | | | | | | | | |
| March ... ... ... ... | | | | 5.74 | 178.00 | 67.10 | 27 | 10 | | | | | | | | | | | | | | | |
| April ... ... ... ... | | | | 15.81 | 474.40 | 88.00 | 5 | 28 | | | | | | | | | | | | | | | |
| May ... ... ... ... | | | | 2.61 | 81.00 | 16.00 | 26 | 14 | | | | | | | | | | | | | | | |
| June ... ... ... ... | | | | 2.63 | 79.00 | 20.00 | 24 | 14 | | | | | | | | | | | | | | | |
| July ... ... ... ... | | | | 0.18 | 5.50 | 3.00 | 13 | 3 | | | | | | | | | | | | | | | |
| August ... ... ... ... | | | | 0.68 | 21.10 | 13.60 | 14 | 3 | | | | | | | | | | | | | | | |
| September ... ... ... | | | | 0.28 | 8.50 | 7.00 | 11 | 2 | | | | | | | | | | | | | | | |
| October ... ... ... | | | | | Nil | | | | | | | | | | | | | | | | | | |
| November ... ... ... | | | | 2.42 | 72.50 | 31.10 | 10 | 7 | | | | | | | | | | | | | | | |
| December ... ... ... | | | | 2.37 | 73.50 | 27.20 | 14 | 9 | | | | | | | | | | | | | | | |

Longitude, 32°.53′ E. Latitude, 3°.32′ S. Altitude, 3,709 feet.

| Months | Mean Pressure | Air Temperature (Degrees Centigrade) (Time of Observations: 9 a.m.) | | | | | | | | | | Tension of Vapour | | | | Relative Humidity | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 1 | 9 | Mean | Mean of Min. | Mean of Max. | Absolute Min. Min. | Absolute Min. Date | Absolute Max. Max. | Absolute Max. Date | 7 | 1 | 9 | Mean | 9 a.m. | 4 p.m. | | Mean |
| January ... ... ... | | | | | 26.35 | 21.15 | 31.55 | 17.50 | 27. | 34.00 | 12. | | | | | | | | |
| February ... ... ... | | | | | 24.05 | 18.99 | 29.11 | 16.70 | 6. | 32.50 | 29. | | | | | | | | |
| March ... ... ... ... | | | | | 27.67 | 22.79 | 32.56 | 16.00 | 2. | 35.00 | 3, 5. | | | | | | | | |
| April ... ... ... ... | | | | | 25.43 | 21.40 | 29.46 | 18.40 | 9. | 31.90 | 4, 5, 20. | | | | | | | | |
| May ... ... ... ... | | | | | 25.98 | 21.72 | 30.25 | 17.60 | 9. | 33.00 | 21. | | | | | | | | |
| June ... ... ... ... | | | | | 25.29 | 20.20 | 30.39 | 16.00 | 19. | 33.00 | 28, 29, 30. | | | | | | | | |
| July ... ... ... ... | | | | | 23.86 | 17.23 | 30.50 | 15.10 | 4. | 34.00 | 1. | | | | | | | | |
| August ... ... ... ... | | | | | 24.94 | 19.91 | 29.97 | 15.10 | 13. | 32.60 | 18. | | | | | | | | |
| September ... ... ... | | | | | 24.75 | 19.34 | 30.16 | 14.40 | 1. | 33.10 | 15. | | | | | | | | |
| October ... ... ... | | | | | 25.06 | 20.16 | 30.06 | 16.20 | 19. | 33.00 | 8. | | | | | | | | |
| November ... ... ... | | | | | 26.04 | 21.69 | 30.39 | 18.00 | 1. | 32.50 | 18. | | | | | | | | |
| December ... ... ... | | | | | 25.99 | 19.68 | 32.31 | 17.80 | 30. | 34.00 | 19, 21, 22. | | | | | | | | |



| Months | Amount of Cloud | | | Rainfall in millimetres on any one day (Time of Observations: 9 a.m.) | | | | Weather Number of days of | | | | | | | Wind Number of Observations of | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 7 | 1 | 9 | Mean | Total for month | Max. | Date | Rain | Snow | Hail | Thunder Storms | Clear sky | Over-cast | Gales | N. | N.E. | E. | S.E. | S. | S.W. | W. | N.W. | Calm. |
| January ... ... ... | | | | 1.94 | 60.20 | 25.00 | 30. | 7 | | | | | | | | | | | | | | | |
| February ... ... ... | | | | 6.78 | 196.70 | 64.00 | 4. | 8 | | | | | | | | | | | | | | | |
| March ... ... ... ... | | | | 3.67 | 112.60 | 74.40 | 27. | 8 | | | | | | | | | | | | | | | |
| April ... ... ... ... | | | | 7.01 | 210.20 | 50.00 | 6. | 17 | | | | | | | | | | | | | | | |
| May ... ... ... ... | | | | 1.62 | 48.90 | 40.60 | 5. | 5 | | | | | | | | | | | | | | | |
| June ... ... ... ... | | | | | Nil | | | | | | | | | | | | | | | | | | |
| July ... ... ... ... | | | | | ,, | | | | | | | | | | | | | | | | | | |
| August ... ... ... ... | | | | 0.95 | 29.30 | 20.20 | 23. | 2 | | | | | | | | | | | | | | | |
| September ... ... ... | | | | 0.10 | 3.00 | 3.00 | 30. | 1 | | | | | | | | | | | | | | | |
| October ... ... ... | | | | 1.84 | 56.30 | 17.90 | 3. | 6 | | | | | | | | | | | | | | | |
| November ... ... ... | | | | 1.95 | 58.40 | 9.70 | 30. | 13 | | | | | | | | | | | | | | | |
| December ... ... ... | | | | 3.32 | 102.90 | 35.80 | 27. | 9 | | | | | | | | | | | | | | | |

## Station: MANYONI (Dodoma District), 1924.

Longitude, 34°.07′ E. Latitude, 5°.39′ S. Altitude, 4,135 feet.

| Months | Mean Pressure | Air Temperature (Degrees Centigrade) (Time of Observations: 9 a.m.) | | | | | | | | | Tension of Vapour | | | | Relative Humidity | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 1 | 9 | Mean | Mean of Min. | Mean of Max. | Absolute Min. | Date | Absolute Max. | Date | 7 | 1 | 9 | Mean | 9 a.m. | 4 p.m. | Mean |
| January ... ... ... | | | | | 21.74 | 15.79 | 27.70 | 13.00 | 11. | 30.00 | 29, 31. | | | | | | | |
| February ... ... ... | | | | | 20.83 | 15.60 | 26.07 | 15.00 | 4. 5, 8, 10, 11, 12, 15, 16, 17, 28. | 29.00 | 2. | | | | | | | |
| March ... ... ... ... | | | | | 21.78 | 15.55 | 28.02 | 13.00 | 5. | 30.00 | 17, 20. | | | | | | | |
| April ... ... ... ... | | | | | 20.52 | 14.92 | 26.12 | 11.50 | 30. | 28.00 | 1, 3, 9, 10. | | | | | | | |
| May ... ... ... ... | | | | | 19.52 | 12.58 | 24.47 | 10.00 | 24. | 31.00 | 20. | | | | | | | |
| June ... ... ... ... | | | | | 18.05 | 11.02 | 25.08 | 8.00 | 27. | 27.00 | 4, 8, 9, 10, 11. | | | | | | | |
| July ... ... ... ... | | | | | 17.18 | 10.07 | 24.29 | 7.00 | 4. | 25.50 | 7, 20, 22, 29. | | | | | | | |
| August ... ... ... ... | | | | | 18.00 | 10.94 | 25.07 | 8.00 | 28. | 28.00 | 19. | | | | | | | |
| September ... ... ... | | | | | 19.67 | 12.20 | 27.15 | 11.00 | 4, 5, 24. | 29.50 | 29. | | | | | | | |
| October ... ... ... | | | | | 21.69 | 13.82 | 29.57 | 12.00 | 1, 3, 4, 9. | 31.00 | 15, 22, 24, 25, 31. | | | | | | | |
| November ... ... ... | | | | | 22.02 | 14.68 | 29.35 | 12.00 | 9. | 31.00 | 7, 24, 25, 28. | | | | | | | |
| December ... ... ... | | | | | 22.61 | 15.22 | 30.00 | 11.00 | 30. | 32.00 | 28. | | | | | | | |

| Months | Amount of Cloud | | | Rainfall in millimetres on any one day (Time of Observations: 9 a.m.) | | | | Weather Number of days of | | | | | | | Wind Number of Observations of | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 7 | 1 | 9 | Mean | Total for month | Max. | Date | Rain | Snow | Hail | Thunder Storms | Clear sky | Over-cast | Gales | N. | N.E. | E. | S.E. | S. | S.W. | W. | N.W. | Calm. |
| January ... ... ... | | | | 2.10 | 65.10 | 23.20 | 31. | 5 | | | | | | | | | | | | | | | |
| February ... ... ... | | | | 4.07 | 118.10 | 23.00 | 23. | 22 | | | | | | | | | | | | | | | |
| March ... ... ... ... | | | | 1.03 | 32.00 | 13.80 | 10. | 9 | | | | | | | | | | | | | | | |
| April ... ... ... ... | | | | 1.37 | 41.10 | 29.60 | 1. | 15 | | | | | | | | | | | | | | | |
| May ... ... ... ... | | | | 0.01 | 0.30 | 0.30 | 7. | 1 | | | | | | | | | | | | | | | |
| June ... ... ... ... | | | | 0.09 | 2.60 | 2.20 | 23. | 2 | | | | | | | | | | | | | | | |
| July ... ... ... ... | | | | | Nil | | | | | | | | | | | | | | | | | | |
| August ... ... ... ... | | | | | ,, | | | | | | | | | | | | | | | | | | |
| September ... ... ... | | | | | ,, | | | | | | | | | | | | | | | | | | |
| October ... ... ... | | | | | ,, | | | | | | | | | | | | | | | | | | |
| November ... ... ... | | | | 0.69 | 20.80 | 14.40 | 9. | 3 | | | | | | | | | | | | | | | |
| December ... ... ... | | | | 1.69 | 52.46 | 35.00 | 28. | 4 | | | | | | | | | | | | | | | |

Longitude, 39° 21′ E. Latitude, 8° 57′ S. Altitude, Sea Level

| Months | Mean Pressure | Air Temperature (Degrees Centigrade) (Time of Observations: 9 a.m.) | | | | | | | | | Tension of Vapour | | | | Relative Humidity | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 1 | 9 | Mean | Means of Min. | Means of Max. | Absolute Min. | Absolute Min. Date | Absolute Max. | Absolute Max. Date | 7 | 1 | 9 | Mean | 9 a.m. | 4 p.m. | | Mean |
| January ... ... ... | | | | | 28.59 | 24.81 | 32.37 | 23.50 | 2, 19, 25. | 35.00 | 31. | | | | | | | | |
| February ... ... ... | | | | | 28.35 | 23.97 | 32.73 | 22.00 | 15, 16, 17, 20. | 35.00 | 1, 2. | | | | | | | | |
| March ... ... ... ... | | | | | 28.79 | 24.47 | 33.11 | 23.00 | 12, 13, 28. | 35.00 | 21, 25, | | | | | | | | |
| April ... ... ... ... | | | | | 28.54 | 24.00 | 33.08 | 22.00 | 23, 24, | 35.00 | 3. | | | | | | | | |
| May ... ... ... ... | | | | | 27.50 | 22.35 | 32.65 | 21.50 | 17, 18, 19, 20, 21, 24, 25, 26, 27, 30. | 34.00 | 10, 11, 12, 13, 18, 19, 20. | | | | | | | | |
| June ... ... ... ... | | | | | 26.29 | 21.38 | 31.20 | 19.00 | 23. | 33.00 | 6, 9, 30. | | | | | | | | |
| July ... ... ... ... | | | | | 25.69 | 20.69 | 30.69 | 19.00 | 4, 11, 12, 13, 14. | 33.00 | 1, 3. | | | | | | | | |
| August ... ... ... ... | | | | | 25.67 | 20.69 | 30.65 | 19.50 | 6, 23, 24. | 32.50 | 14. | | | | | | | | |
| September ... ... ... | | | | | 26.15 | 22.07 | 30.23 | 20.00 | 19, 20, 21, 29. | 32.00 | 4. | | | | | | | | |
| October ... ... ... | | | | | 27.43 | 24.08 | 30.79 | 20.50 | 31. | 32.00 | 20. | | | | | | | | |
| November ... ... ... | | | | | 28.50 | 25.23 | 31.77 | 24.00 | 15, 16, 18. | 33.00 | 7, 13. | | | | | | | | |
| December ... ... ... | | | | | 29.00 | 25.53 | 32.48 | 20.00 | 2. | 33.50 | 31. | | | | | | | | |

| Months | Amount of Cloud | | | Rainfall in millimetres on any one day (Time of Observations: 9 a.m.) | | | | Weather Number of Days of | | | | | | | Wind Number of Observations of | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 7 | 1 | 9 | Mean | Total for month | Max. | Date | Rain. | Snow. | Hail. | Thunder Storms | Clear Sky. | Over-cast | Gales | N. | N.E. | E. | S.E. | S. | S.W. | W. | N.W. | Calm. |
| January ... ... ... | | | | 2.83 | 87.80 | 37.60 | 18. | 7 | | | | | | | | | | | | | | | |
| February ... ... ... | | | | 6.20 | 179.70 | 71.10 | 2. | 15 | | | | | | | | | | | | | | | |
| March ... ... ... ... | | | | 3.77 | 117.00 | 39.00 | 27. | 11 | | | | | | | | | | | | | | | |
| April ... ... ... ... | | | | 0.81 | 24.40 | 9.40 | 5. | 7 | | | | | | | | | | | | | | | |
| May ... ... ... ... | | | | 0.06 | 2.10 | 2.10 | 23. | 1 | | | | | | | | | | | | | | | |
| June ... ... ... ... | | | | 0.53 | 16.00 | 6.40 | 23. | 4 | | | | | | | | | | | | | | | |
| July ... ... ... ... | | | | | Nil | | | | | | | | | | | | | | | | | | |
| August ... ... ... ... | | | | 0.01 | 0.30 | 0.30 | 14. | 1 | | | | | | | | | | | | | | | |
| September ... ... ... | | | | 0.30 | 9.00 | 6.30 | 12. | 3 | | | | | | | | | | | | | | | |
| October ... ... ... | | | | 0.09 | 2.90 | 2.20 | 14. | 4 | | | | | | | | | | | | | | | |
| November ... ... ... | | | | 0.55 | 16.60 | 8.30 | 14. | 6 | | | | | | | | | | | | | | | |
| December ... ... ... | | | | 0.46 | 14.30 | 8.00 | 17. | 4 | | | | | | | | | | | | | | | |

## STATION: AMANI (TANGA DISTRICT), 1924.

Longitude, 38°.38′ E. Latitude, 5°.6′ S. Altitude, 3,004 feet.

| Months | Mean Pressure 7 | 1 | 9 | Air Temperature (Degrees Centigrade) (Time of Observations: 9 a.m.) Mean | Mean of Min. | Mean of Max. | Absolute Min. | Date | Absolute Max. | Date | Tension of Vapour 7 | 1 | 9 | Mean | Relative Humidity 9 a.m. | 4 p.m. | | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| January ... ... ... | | | | 22.65 | 17.95 | 27.36 | 15.55 | 3. | 29.00 | 4, 12, 15. | | | | | | | | |
| February ... ... ... | | | | 22.59 | 17.96 | 27.23 | 12.22 | 14. | 29.10 | 1. | | | | | | | | |
| March ... ... ... ... | | | | 22.35 | 18.17 | 26.54 | 16.66 | 6, 13. | 28.00 | 24. | | | | | | | | |
| April ... ... ... ... | | | | 20.74 | 17.88 | 23.61 | 16.66 | 16, 26, 27, 30. | 27.10 | 2, 3. | | | | | | | | |
| May ... ... ... ... | | | | 20.10 | 16.50 | 23.70 | 13.33 | 30. | 25.10 | 21. | | | | | | | | |
| June ... ... ... ... | | | | 18.88 | 15.42 | 22.35 | 11.66 | 5. | 24.00 | 5, 7, 8, 13. | | | | | | | | |
| July ... ... ... ... | | | | 17.96 | 14.23 | 21.69 | 10.55 | 1, 2. | 23.10 | 20. | | | | | | | | |
| August ... ... ... ... | | | | 18.04 | 13.77 | 22.32 | 10.55 | 31. | 25.00 | 27. | | | | | | | | |
| September ... ... ... | | | | 18.41 | 14.13 | 22.69 | 11.66 | 16, 28. | 25.10 | 30. | | | | | | | | |
| October ... ... ... | | | | 18.86 | 13.55 | 24.18 | 16.55 | 15. | 26.33 | 10, 21. | | | | | | | | |
| November ... ... ... | | | | 21.42 | 16.08 | 26.76 | 11.66 | 7. | 29.00 | 8. | | | | | | | | |
| December ... ... ... | | | | 22.65 | 17.08 | 28.22 | 16.11 | 1, 3, 4, 8, 10, 19, 20, 24, | 31.00 | 6, 7. | | | | | | | | |

| Months | Amount of Cloud 7 | 1 | 9 | Rainfall in millimetres on any one day (Time of Observations 9 a.m.) Mean | Total for month | Max. | Date | Weather Number of Days of Rain | Snow | Hail | Thunder Storms | Clear sky | Over-cast | Gales | Wind Number of Observations of N. | N.E. | E. | S.E. | S. | S.W. | W. | N.W. | Calm. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| January ... ... ... | | | | 1.80 | 55.90 | 19.30 | 19. | 16 | | | | | | | | | | | | | | | |
| February ... ... ... | | | | 7.63 | 221.40 | 104.40 | 17. | 21 | | | | | | | | | | | | | | | |
| March ... ... ... ... | | | | 4.69 | 145.50 | 45.50 | 9. | 23 | | | | | | | | | | | | | | | |
| April ... ... ... ... | | | | 12.04 | 361.30 | 78.20 | 26. | 26 | | | | | | | | | | | | | | | |
| May ... ... ... ... | | | | 7.84 | 243.00 | 36.40 | 14. | 17 | | | | | | | | | | | | | | | |
| June ... ... ... ... | | | | 4.56 | 136.70 | 41.50 | 8. | 23 | | | | | | | | | | | | | | | |
| July ... ... ... ... | | | | 2.92 | 90.70 | 38.80 | 12. | 13 | | | | | | | | | | | | | | | |
| August ... ... ... ... | | | | 2.69 | 83.30 | 25.50 | 13. | 17 | | | | | | | | | | | | | | | |
| September ... ... ... | | | | 2.32 | 69.60 | 17.00 | 4. | 17 | | | | | | | | | | | | | | | |
| October ... ... ... | | | | 0.92 | 28.40 | 9.65 | 26. | 6 | | | | | | | | | | | | | | | |
| November ... ... ... | | | | 1.60 | 48.00 | 9.80 | 9. | 11 | | | | | | | | | | | | | | | |
| December ... ... ... | | | | 2.14 | 76.40 | 26.30 | 15. | 13 | | | | | | | | | | | | | | | |

# APPENDIX V.

## BIOLOGICAL AND AGRICULTURAL INSTITUTE, AMANI.

### ABSTRACT OF REPORT FOR THE YEAR 1924-25.

The systematic cleaning of the plantations, the removal of dead branches and trees, eradication of parasites, and the raising of plants by the nursery staff for the conservation of those in bad or damaged condition, was the chief work of importance and every effort was made to make this effective.

2. Plants raised in the nursery, primarily for the special purpose, included:—

(a) Coral Tree, *Hovenia dulcis*.—As only two specimens of this tree were at Amani, about 50 plants have been raised and are now ready for planting out in their permanent quarters.

(b) Barbatimao, *Stryphnodendron Barbatimam*.—The few plants in the plantation of this species are fast dying out and seedlings have been raised with a view to making a new small plantation as soon as they are fit for transplanting.

(c) Common Wattle, *Acacia decurrens*.—The wattle plantation has been damaged badly by falling trees, and others are fast dying out. A few specimens have been raised and are ready for planting out, while it is intended to raise seedlings and plant up a new plantation as soon as fresh stocks of seeds are available.

(d) *Bauhinia acuminata*.—A single mature plant only of this species exists at Amani; so that a few plants have been raised and planted in the Institute grounds.

(e) *Eucalyptus* spp.—About 16 different species have been raised and will be planted out when ready. The Eucalyptus trees suffered badly through neglect during the war, and many have died since, so that a new stock of a few plants of each species obtainable has been raised. A few species however still remain to be grown as soon as seeds are available.

3. The plot of efwatakala grass (*Melinis minutiflora*) flowered and seeded well during the year. An extension of the plot was therefore made and the whole is doing well.

4. In accordance with instructions from Head Office, all available space in the nursery and irrigation plots was planted up with ginger. About 200 lb. of rhizomes was planted and it is hoped that a sufficient quantity will be available for distribution to the natives for growing in the hills in the district, where it should do exceedingly well.

5. A new clove plantation was established at Sigi, the old plantation having been practically destroyed by termites during the neglect in the latter stages of the war.

6. Results obtained with introduced plants were as follows:—

(a) *Juniperus bermudiana*.—Seeds of this coniferous tree, received in January, 1924, from the Director, Royal Botanic Gardens, Kew, have germinated and a bed of seedlings has been planted out in the nursery. These are doing well.

(b) Collection of fourteen Palmae. This was the only importation of seed received at Amani during the year; it has been sown in the Sigi nursery.

7. A list of additions and amendments to the seed list was made and forwarded to Head Office in December. Additions comprised 59 species, making the number available at the Amani Institute 357.

8. Inventories were made of stores and library. An audit of all stores, etc., was taken by the Audit Department during the year.

9. Distribution of planting material was as follows:—

| (a) Seeds. | Packets. |
|---|---|
| Coffee ... ... ... ... ... ... ... ... ... ... | 29 |
| Ginger ... ... ... ... ... ... ... ... ... ... | 7 |
| Ornamental trees, shrubs and plants ... ... ... ... ... ... | 231 |
| Shade Trees and windbreaks ... ... ... ... ... ... | 128 |
| Fruit ... ... ... ... ... ... ... ... ... ... ... | 199 |
| Palms ... ... ... ... ... ... ... ... ... ... ... | 55 |
| Spices ... ... ... ... ... ... ... ... ... ... | 27 |
| *Cinchona* spp. ... ... ... ... ... ... ... ... ... | 27 |
| Economic plants other than the above ... ... ... ... ... ... | 229 |
| Total | 932 |

In addition to the above, seed in larger quantities was supplied as follows: 21 lb. of coffee, and 41 kgs. of maize of which 35 kgs. were supplied for native planting in the Tanga district.

(b) Plants.

| | Packets. |
|---|---|
| Cloves ... ... ... ... ... ... ... ... ... ... | 850 |
| Shade trees, *Poinciana regia* (for Tanga township plantings) ... ... | 160 |
| Miscellaneous ornamental plants ... ... ... ... ... ... ... | 173 |
| Tubers ... ... ... ... ... ... ... ... (bundle) | 1 |
| Cuttings, ornamental plants ... ... ... ... ... ... ... | 4 |
| Sugar-cane cuttings ... ... ... ... ... ... ... ... | 1,000 |
| Total | 2,188 |

10. Three of the stock died during the year; 17 were sold, realizing Shs. 737., and eight calves were born. The total now on charge is 35.

11. An inspection of the Kwamkoro and Sangarawe coffee plantations, also of the Kihuhui sisal estates, was made by the Head Gardener, in July and December, and reports submitted to the Director of Agriculture.

12. In August the making of a road wide enough for motor traffic was begun and this reached Amani in September; it brings Amani within three hours of Tanga.

13. Eight cases containing 171 specimens were forwarded to Wembley for the Tanganyika Court of the British Empire Exhibition 1925.

# APPENDIX VI.

## ENTOMOLOGICAL REPORT, 1924-25.

*Buildings.*—The renovation of the north wing of the former dwelling of the German farm overseer situated on the Morogoro Agricultural Station, was completed. The wing now consists of a spacious main laboratory, Entomologist's Office and dark room. In the reconstruction of the storage accommodation, two small rooms have been assigned to the Entomological laboratory for insecticides and apparatus. The outdoor insectary, erected in 1923, has been maintained in thorough repair.

2. *Staff.*—Endeavour is being made to train native staff for laboratory and field work; but, while the work of collecting and preparing is reasonably quickly acquired, the lack or paucity of fundamental education is a considerable drawback in the important work of keeping field notes and records. The present lack of European assistance is distinctly felt and the carrying out of much routine work takes time which might be given to technical investigation.

3. *Collections.*—The collection of insects of the Territory now includes a total of 956 species identified by the Imperial Bureau of Entomology.

4. *Legislation.*—Technical assistance was given in the work of revision of the Cotton Rules under the Cotton Ordinance, 1920.

5. *Publications.*—Considerable use has been made of the Territory's weekly journal, the *Dar es Salaam Times*, to bring current entomological topics before the attention of the planting community. Articles have appeared in this to the number of fifteen, between August, 1924, and March, 1925. Separates of the articles in the *Dar es Salaam Times*, have, when deemed advisable, been distributed to agricultural officers, planters and planters' associations.

6. *Plant importation.*—This has been confined to the importation of deciduous and sub-tropical fruit trees by European planters in the northern and south-western districts and to garden plants from Kenya and Zanzibar.

7. *Plant identifications, etc.*—

(a) The parasitic weed known locally as "msani", has been indentified by Kew as *Striga lutea*. Two further species have been collected and await identification. No complaints of this pest would be heard were cleaner cultivation practised by the native in his sorghum fields.

(b) Examples of the sorghum smuts of the Territory (*Ustilago reiliana*, *Sphacelotheca sorghi* and *S. cruenta*) were forwarded to the Division of Botany, Pretoria, to assist in a general investigation of this family.

(c) Two consignments of seed of *Chrysanthemum cinerariaefolium*, the source of pyrethrum powder, were procured for trial but both failed to germinate.

(d) Seed of eleven varieties of sorghum for trial as to their general resistance to sorghum smuts was procured at the Entomologist's suggestion from the United States Department of Agriculture, and has been planted at the Morogoro Agricultural Station.

(e) Eleven varieties of Sudan sorghums procured for trial from the Government Botanist, Khartum, in connection with investigation of grain insects were planted at the Morogoro Agricultural Station in the season 1924, but were ruined by a serious attack of the sorghum rust *Puccinea purpurea*.

(f) Twenty-seven local sorghums are being grown for observation as to type, etc., in relation to their suitability of grain to resistance to attack by storage insects. Loose-headed types with glumes not applied to fruit have in experiments proved exceedingly resistant to moth and weevil but their proneness to scatter their grain is an objectionable feature.

(g) The Dodoma type of bulrush millet is being grown under the conditions of Morogoro with a view to observing any effect of change of locality on resistance of grain to attack by insects. It is complained by exporters that, compared with Dodoma millet, those from other localities on the Central Railway are of a softer and less desirable type which quickly deteriorates.

8. *Local alkali for spraying mixtures.*—Reports were received from the Imperial Institute on (a) Natural soda deposits collected on Sanya Plain in relation to their use by coffee planters in the vicinity; (b) Lime samples from Moshi and Arusha in relation to their suitability for the making of Lime Sulphur.

(a) Natural soda:—This proved to be largely a mixture of bicarbonate and carbonate of soda and could be profitably used in the preparation of Burgundy Mixture, Resin Sticker, or (in conjunction with caustic lime) caustic soda for sheep dip, etc. It might also be used for the making of soap for use in spraying.

(b) Lime samples.—The samples had been badly burned. All three had an objectionably high magnesium content, the Kilimanjaro sample with 18 per cent. of magnesium oxide being on this account unsuitable for the preparation of lime-sulphur. The Arusha samples with slightly over 3 per cent. may prove suitable. When completely burned, these Arusha limes are, however, of such poor quality that double the quantity in formulae for lime-sulphur will require to be used and there will be an excessive amount of sludge.

9. *Other Imperial Institute matters.*—Information was requested from the Insitute on the question of the bleaching of beeswax and on the food analysis and market value of the grain of certain types of Sorghum which in experiment had exhibited resistance to storage insects.

10. *Silk.*—Nests of Iringa silkworm, *Diapalpus congregarius*, Strand, together with a bred-out series of male and female moths and parasites, were forwarded to the Imperial Bureau of Entomology for an opinion as to suitability of this silk to British silk spinners. Material from *Anaphe infracta*, Wal., collected in the Uluguru Mountains is on hand and has been offered to the Bureau for experimental use if it should be required. There has been no native silk export since 1914.

11. *Beeswax.*—Reports on sun-bleached beeswax prepared in the Territory were received from the Division of Apiculture, United States Bureau of Entomology, the Division of Entomology, Pretoria, and the Apis Club, Benson, Oxon, and the information circulated. The general opinion was that colour was not up to standard and that the odour and feeling suggested that of tallow. With a view to improvement of bleaching practice, a query was addressed to the Imperial Institute. The presence within the Territory of hundreds of square miles of unproductive Ceara rubber interferes with the odour and taste of much of the wax of the country, and buyers who desire a wax suitable for the manufacture of comb-foundation and toilet preparations discriminate against the product and cause a limited market and a somewhat lower price.

12. *Forest insects.*—The Conservator of Forests has been advised from time to time on insect pests affecting forests and forest nurseries.

13. *Insects affecting livestock.*—A Limmacodid submitted by the Chief Veterinary Officer as supposed to cause the death of cattle and goats in the Lindi area has been identified as *Parasa virida*, Walk. The belief concerning this and similar slug caterpillars would appear to be widespread amongst the natives of the Territory. Besides its native food plants, *P. virida* feeds on the foliage of cotton.

14. The following Tabanidae now in the collection fall to be added to Morstatt's list for the Territory appearing in *Der Pflanzer*, Vol. IX, No. 10, October, 1913, pp. 508-9: *Tabanus conspicuus*, Rie., *T. insignis*, Lw., *Haematopota pertinens*, Aust., *Chrysops austeni*, Neave, and *C. wellmani*, Austin.

15. *Vermin attacking crops.*—The root rat, *Rhizomys splendens*, became very destructive on sisal estates round Korogwe, young succulent sisal planted out from one to two years, on the root of which the rat feeds, being preferred. As many as ten plants may be destroyel in a single night by one rat. Estates at present deal with the pest by tracing the burrows, digging out the rats and killing them. Rats are bought at from 25 to 50 cts. per head. Experiments in the control of the root rat by calcium cyanide are being arranged.

16. *Pests of sisal.*—In October, the Planters' Association, Tanga, called attention to the prevalence in that area of the sisal weevil, *Scyphophorus acupunctatus*, Gyl. Information and advice for this were given in the report for the year 1922. The present distribution (1924) of the weevil is included in a triangular area defined by Korogwe, Amboni, Mwera.

17. *Pests of coconuts.*—Investigation shows that in the Territory the so-called coconut weevil, *Rhyncophorus ferrugineus*, F., is rarely found on coconuts. The principal breeding grounds of this insect are the native palms, *Borassus flabellifer*, *Phoenix reclinata*, and *Hyphaene coriacea*, the buds of which are tapped for the making of native alcohol. It is the devitalised or decaying tissues of these palms which prove attractive. As has been previously remarked, the behaviour of the Rhyncophorus is comparable to the West Indian *Metamasius serriceus*, Oliv.

18. *Pests of coffee.*—An enquiry was received from the Director of Education as to suitable sprays and spray pumps for use in schools in coffee districts. The Entomologist, Kenya, was, on inquiry, informed that the coffee bean borer, *Stephanoderes hampei*, Ferr., had, after the most careful search, not been found in the main Meru, Kilimanjaro and Usambara Arabian coffee areas, and would appear to be confined to the Bukoba Robusta area; and that it was considered that it would be inadvisable to permit the cleaning of coffee in Nairobi. *Apate monachus*, F., appeared in December, in the same part of the Arusha area (N.W.) as in 1923. The occurrence of this borer is rare and injections of chloroform or carbon bisulphide into its workings are an effective control. *Thliptoceras octoguttale*, Fld., was complained of in the Kilimanjaro area in February. The berry moth can be controlled by arsenate of lead sprays applied between and behind the berries. A combined spray of arsenate of lead and Bordeaux mixture is advised. The berry moth rarely causes more than a thinning of crop, akin to stripping, which is to be reckoned as somewhat beneficial and tending to prevent that general exhaustion of coffee altogether too common in Arusha and Moshi, ordinarily referred to as "die-back." Seasonable rains fell in the northern coffee districts in the early months of the year and general freedom from thrips attack has in consequence been reported. An identification of the thrips on coffee in Tanganyika has not yet been given by the Imperial Bureau; but it is known that it is not the Diarthrothrips of Kenya. *Leucoptera coffeella*, Staint. was complained of in Kilimanjaro in December. Cultural measures to stimulate the bushes to rapid and abundant leaf growth were advised. This will in most cases adequately offset the work of this leaf miner. Care in the location of nurseries and in their management is essential. Overcrowding or overshading should be avoided and nurseries must be established well away from

standing coffee. From experiments, begun in 1923, in the control of coffee bug, *Antestia variegata*, Thunbg. var. *lineaticollis*, Stal., evidence is accumulating that a sweetened poison spray can be applied against this pest with considerable effect. The formula adopted for trial was: sodium arsenite 100 gms.; native sugar 1 kg.; water 100 litres. The spray is flicked lightly two or three times over the coffee bush. It is not applied as a wetting or drenching spray. So far as has been observed, there is no injury to berries or mature foliage but new growth may show scorching. Least injury and best results are obtained when the spray is applied in dull, misty, or overcast weather. Further experiment is necessary for ensuring absolute safety of application and procuring a reliable mixture. On one plantation where the spray has been used for two crops, economical control with a minimum of injury has been obtained. The method when perfected will supplant the present widespread practice of hand collection, which proves slow and costly both in labour and crop.

19. *Pests of cotton.—Anatrachyntis* (Pyroderces) sp. appeared in scattered areas in late October and November. In the making of boll counts, the pink worms of this moth may be confused with those of Platyedra. Distinction however, is easy in that Anatrachyntis is pink while Platyedra caterpillars of similar size would still be creamy white, not having advanced sufficiently to assume the late larval colour. The caterpillars of Anatrachyntis are to be found living in locules of bolls previously destroyed by Platyedra and no cases have been observed where this moth may be considered as other than a scavenger or secondary parasite of cotton. The leaf-miner of cotton, *Gracillaria* sp., appears annually on the young cotton, the season of highest incidence being May. Infestation is extremely variable from plantation to plantation, ranging from none to 83 per cent. as found. The degree of individual infestation is observed to be extremely low, averaging 1.38 leaves per plant. The blotching on any one leaf by the leaf-miner is on the average never excessive and the general effect on plant progress negligible. As a cotton pest, no importance may at present be attached to leaf-miner in the Territory.

20. The effect of the work of cleaning up stems and residues in cotton plantations at the conclusion of seasons 1922 and 1923 has been extremely satisfactory against the cotton weevil, *Apion xanthostylum*, Wagn. The presence of the pest in destructive numbers may be taken as immediately indicative of the existence of previous year's cotton in the vicinity. Such cotton on examination wil be found to be infested at every node, even to the nodes of the most delicate twigs, the pest appearing to gain entry and flourish in dried-up, neglected, or abandoned cotton. The collar of such plants is also grossly proliferated. With a reasonable modicum of attention to field sanitation at the end of the crop, this should henceforth recede to a minor place as a Territory cotton pest. There can be no doubt of its potentiality as a pest, however, should the sanitation of cotton fields come to be generally neglected through relaxation of control.

21. *Tragiscoschema nigroscripta*, Fairm., is reasonable for the greater share of the cotton stem girdling observable. The work of this Lamiid consists of a simple ringing and does not show the egg-fuzz typical of the weevil girdler, *Alcides brevirostris*, Boh., to which German observers would appear from literature to have attached the greater importance. In three cotton seasons, the work of Alcides has been observed once. The effect of girdling on seasonable cotton is to thrust the strength of the plant into the lower primaries and hasten maturity of the lower bolls. At the season of incidence of Tragiscoschema, *viz.* June to July, girdling which is usual at about 30 inches from the ground has had no observed unfavourable effect. The caterpillars of American bollworm, *Heliothis* (Chloridea) *obsoleta*, F., appeared this year on the first foliage of cottons planted with the early rains of January. Later, in March to April, caterpillars were taken on the cobs of maize planted in January. It would appear then that the heavy infestation of the first cotton bolls of mid-May to mid-June, formerly reported on, is more or less dependent upon the incidence of the pest on the main native maize crop, *i.e.* the January planting, and on the extent of maize cultivation in the vicinity of cotton. The moths resulting from the cotton boll caterpillars of May to June are mainly short-season pupating forms (14 to 21 days) but this brood also contains rarer aestivating forms pupating in 160 to 165 days, which period brings the Heliothis to the small-rain period and the foothill maize crop. After the disappearance of the May to June brood, cotton bolls are fortunately no further attacked and cotton planted in places suitable as to weather and soil and well husbanded can in the average season make good the loss of bolls resulting from the attack of Heliothis. Heliothis has been observed on tomato, *Cajanus indicus*, and maize, besides cotton. Extension search has so far not produced a single example on tobacco heads. The greasy leaf worm, *Prodenia litura*, F., appears in the season of prevalence of Heliothis, but has so far only been casually met with and has nowhere appeared in destructive numbers. Prodenia has not been reared from any other crop so far in the Territory. *Earias insulana*, Bdv., and *E. citrina*, Saalm., were sparingly present throughout the cotton areas and their work calls for no remark. *E. citrina* would appear to be the commoner form in the Territory, judging from the records of 1923 and 1924. Two important African cotton pests, the cotton stem borer, *Sphenoptera neglecta*, Klug., and the red bollworm, *Diaparopsis castanea*, Hmpsn., have so far neither been observed nor reported since observations were begun by the Department. Cotton aphis, *A. gossypii*, was generally present in the past season, but seasonable weather and the natural enemies of aphids may be relied upon to prevent important damage. The following predatorial coccinellids have been identified on cotton aphis: *Alesia striata*, F., *Chilocorus wahlbergi*, Muls., *Cydonia posticalis*, Fairm., *Cydonia lunata*, Fab., *Cydonia 4-lineata*, Muls., *Platynaspis capicola*, Crotch, *Platynaspis kollari*, Muls., and *Scymnus trepidulus*, Wse. The caterpillars of the following Lepidoptera may be added to the list of cotton leaf-feeders which appeared in the report for 1922: *Parasa virida*, Wlk., *Taragma carinata*, Wllgrn., *Xanthodes graellsi*, Feisth., *Anomus flava*, F., and *Arctornis* (?) *rubricosta*, Fawcett.

22. The prevailing stain fungus of the Territory is an organism akin to the species D described in *Diseases of Crop Plants in the Lesser Antilles*, p. 31. The effect of this organism is, however, also inter-related with that of *Bacterium malvacearum*, Anthracnose, etc., a complex the organisms of which deserve closer study and isolation.

23. Experiments of 1924 have demonstrated that exclusion of insects from access to flower and boll ensures normal healthy development of boll wall and boll contents. Protected bolls open quite satisfactorily even under weather conditions which would be judged as highly conducive to propagation of disease, and at a season when the incidence of boll affection of the main crop is unduly high.

24. Three species of cotton stainer (*Dysdercus nigrofasciatus*, St., *D. fasciatus*, Sign., and *D. cardinalis*, Gerst.) are generally present throughout the cotton-growing districts. The following related hemiptera have also been recorded in this Office as occurring on cotton: *Odontopus confusus*, Dist., *Antilochus nigrocruciatus*, St., *Agonoscelis versicolor*, F., *Callidea bohemani*, St., *Lygaeus pandurus*, Scop., *Lygaeus furcatus*, F., *Nezara viridula*, L., *Nezara chloris*, Westw., *Nezara chlorocephala*, Westw., *Nezara millieri*, M. and R., *Leptoglossus membranaceus*, F., *Atelocera stictica*, Westw., *Bagrada hilaris*, Burm., *Halyomorpha viridescens*, Wlk., *Aspilocoryphus fasciativentris*, St., *Steganocerus multipunctatus*, Thnbg. The presence of four species of Nezara, including *N. viridula* which has been especially observed as a pest in the West Indies, is worthy of note. The incidence of cotton stainers in the central cotton area where the greater portion of the field observations have been made has never been unduly high on the average plantation. Cotton stainers can be observed in greatest abundance when the main kapok crop is maturing, *viz.* late November and December, a season of the year when the cotton crop has been completely picked. Incidence of these pests even mildly approaching such as has been observed by the writer regarding *D. andreae* in the West Indies has never been seen, and it is essential to go farther than mere acceptance of the problem in the Territory as analogous to that of the West Indies (St. Vincent). For the present it is necessary to postulate that the observed incidence of Dysdercus cannot in itself or in conjunction with the other hemiptera listed, be accepted as fully explaining the prevalance of cotton staining. One does not observe unfailingly direct correlation of Dysdercus and stain. High incidence of staining is a concomitant of high incidence of stainer, but high incidence of staining has been observed equally as often on plantations where the incidence of stainer was extremely low. It is admitted that Dysdercus is an observed transmitter of stain fungus and other boll affections but the observed facts tend to demonstrate that other agents or methods of transmission are also at work *e.g.* invasion down the style. Moreover, the plant and its general condition, and its adaptation or relation to environment, must enter into consideration in success or lack of it in invasion by disease.

25. The situation as to pink bollworm, *Platyedra gossypiella*, Saunders, is not as satisfactory as it might reasonably be expected to be. There already exist the powers whereby Platyedra might, to give a technical opinion, be held to the vanishing point, namely the Cotton Rules, 1922, and the Native Authority Ordinance, 1923; but the fact must be faced that the native, even with the high prices of cotton which have prevailed and have recompensed him for his labour beyond the existing price of practically any other agricultural product, has shown in too many instances complete disregard of his instructions in the matter of picking, preparation and uprooting in relation to the control of pests, and a disinclination to appreciate the fact that his lazy conduct jeopardises the future of cotton in the Territory. The countryside contains much abandoned cotton in places and the good work of non-native planters and the industrious, progressive native is set at nought by the negligence of the indolent, hand-to-mouth native. It was considered a duty to present a communication on this phase of cotton production in December, 1924, for forwarding to the central administration, and its terms remain most important in regard to the future of cotton. Such investigational work in various phases of control as are at present on hand may supplement but can never supplant good work, simple as it may seem, by the cotton grower.

# APPENDIX VII.

## REVENUE, FINANCIAL YEARS, 1923-24, 1924-25.

| | 1923-24. | | 1924-25. | |
|---|---|---|---|---|
| | Shs. | Total, Shs. | Shs. | Total, Shs. |
| Receipts from Government Plantations:— | | | | |
| Dodoma ... ... ... ... | 58·00 | | 70·00 | |
| Tabora ... ... ... ... | 456·63 | | 462·39 | |
| Morogoro ... ... ... | — | | 753·08 | |
| Lushoto ... ... ... ... | 26·84 | | 972·20 | |
| Mahenge ... ... ... ... | 48·00 | | 51·00 | |
| Tanga ... ... ... ... | 12,557·00 | | 39,763·00 | |
| Bagamoyo ... ... ... | 13,255·00 | | 16,028·00 | |
| Utete ... ... ... ... | 683·00 | | 670·00 | |
| Lindi ... ... ... ... | 1,141·95 | | 826·33 | |
| Mikindani ... ... ... | 248·67 | | 442·00 | |
| Kilwa ... ... ... ... | 174·29 | | 280·92 | |
| Kigoma ... ... ... ... | 544·00 | | 474·92 | |
| Kilosa ... ... ... ... | 209·00 | | 238·00 | |
| Pangani ... ... ... ... | 1,227·38 | | 1,754·15 | |
| Dar es Salaam ... ... ... | 26,521·06 | | 28.007·00 | |
| Kasanga ... ... ... ... | 95·00 | | 76·87 | |
| Mwanza ... ... ... ... | 335·00 | | 350·00 | |
| Miombo Government Farm ... | 1,000·00 | | 1,000·00 | |
| Mafia ... ... ... ... | — | | 888·58 | |
| | | 58,580·82 | | 93,108·44 |
| Miscellaneous Sales of Produce and Planting Material:— | | | | |
| Amani Institute ... ... | 2,231·33 | | 2,413·80 | |
| Mpamganya Agricultural Station | 2,318·38 | | 2,252·13 | |
| Morogoro Agricultural Station | 685·73 | | 117·46 | |
| Botanic Gardens, Dar es Salaam | 103·00 | | 38·50 | |
| Headquarters Office, Dar es Salaam ... ... ... | 495·00 | 5,833·44 | 424·26 | 5,246·15 |
| Totals ... ... | | 64,414·26 | | 98,354·59 |